CHARM II - LSC6600

Instructions &

Documentation

17 June 2005

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Charm II 6600 Analyzer Reflector Cleaning Instructions

The Charm II Analyzer should not be operated with debris in the detector housing. These instructions describe disassembly and clean-out of the detector unit. This procedure should be performed if debris gets into the test tube cylinder (e.g. broken test tube, spills, etc.).

This procedure should be performed only in emergency situations at the direction of Charm Support Staff. Improper cleaning by non-authorized persons may void warranty and result in costly repairs.

Read the entire procedure before attempting repair.

For 6600 Serial Number 200 and above.

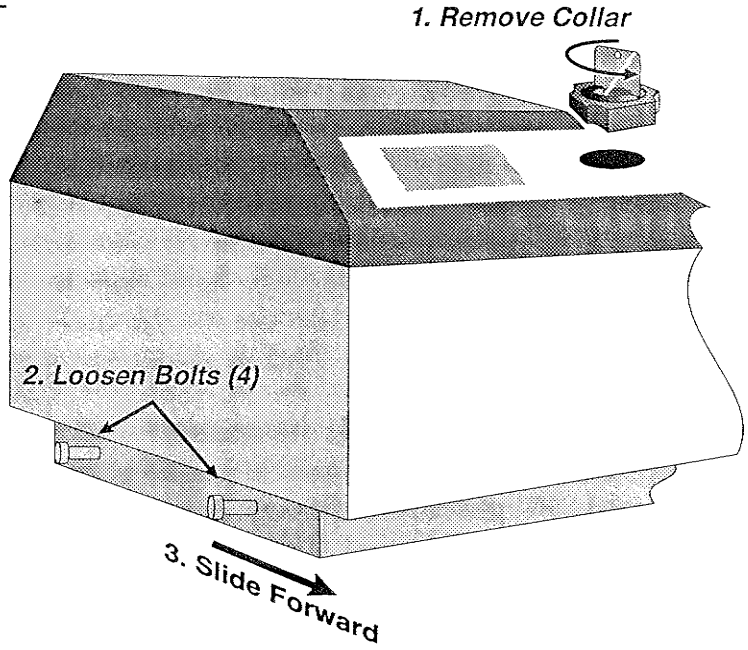
Charm II 6600 Analyzer Reflector Cleaning Instructions

Read the instructions completely before beginning.

1. **IMPORTANT: Unplug the analyzer power cord.** Disconnect all cables from the rear of the unit.

   Span the analyzer between two table ends so access can be safely gained to the bottom. **Be sure the analyzer is secure and *do not work under the unit.*** Recruit help if you need it.

2. Use the supplied tool to unscrew and remove the collar. Loosen the four spring retained bolts on the sides of the cover base. Slide the cover forward and place the cover on its right side to the right of the chassis. Be careful not to tug on any wires attached to the cover.



3. CAUTION: FOLLOW SAFETY PROCEDURES CAREFULLY DURING THIS STEP.

   Wear safety goggles and gloves when opening the bottom. Be prepared to catch (with towels, tray, etc.) whatever falls out of the unit. Do not work under the unit.

   Hold the plunger housing cap in place—it is spring loaded—while you remove the two screws holding the guide. Remove the plunger housing cap and the spring. **Watch out for falling glass fragments and fluid.** Be prepared to catch the plunger and spring if they fall easily out.

   If necessary, insert the eraser end of a pencil through the top of the detector housing and push the plunger out through the bottom of the housing.

4. Loosen the holddown tab screws far enough to allow the tabs to rotate out of the tube cylinder slot. Carefully remove the tube cylinder taking care not to damage the switch. Gently lay the tube cylinder down between the main detector housing and the electronics rack.

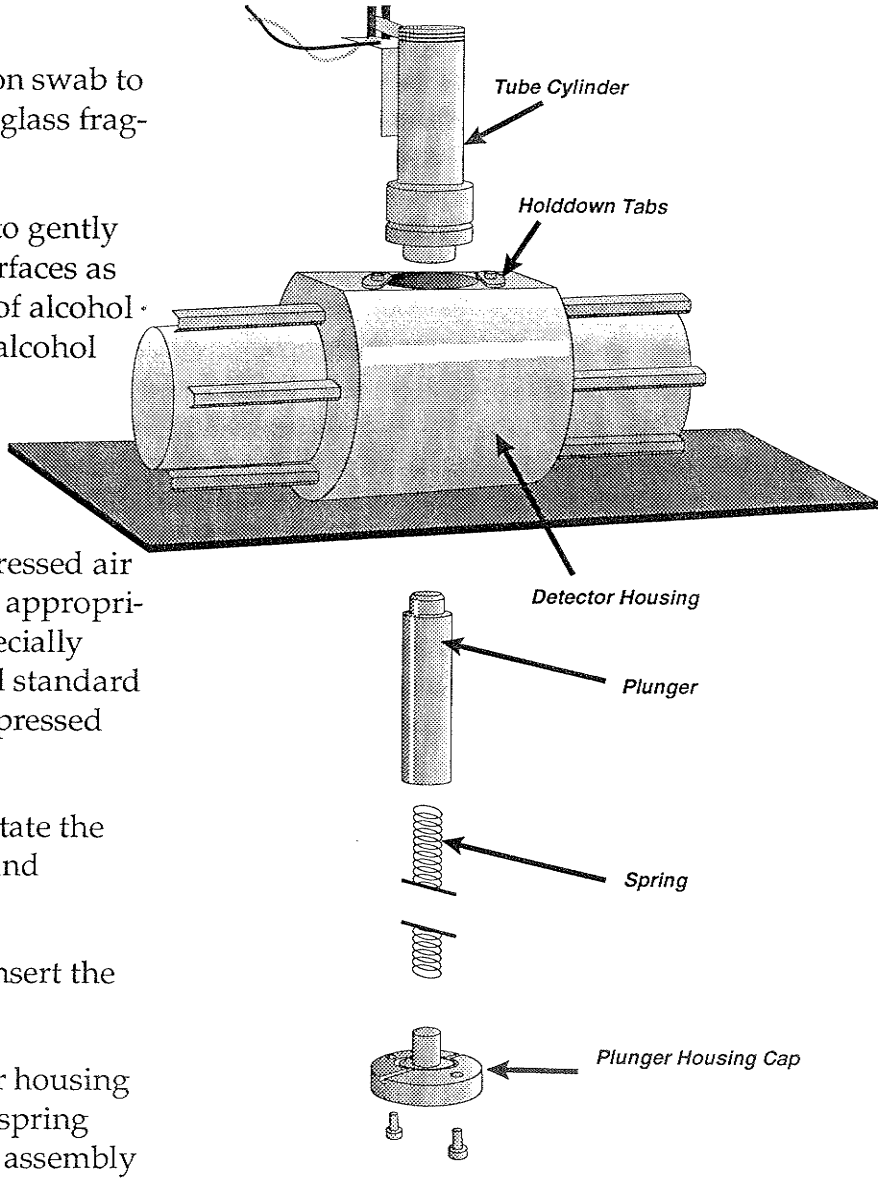
   Thoroughly clean the plunger, plunger housing cap and screws with denatured alcohol. Set aside to dry.

5. Use a flashlight to look through the top of the detector housing. With a small soft artists brush and clean alcohol, gently work any foreign matter down through the hole into the towels. Be very careful not to scratch the mirrored

surfaces or frosted faces inside the detector housing.

Use the wooden end of a cotton swab to gently dislodge any stubborn glass fragments.

Finally, use a very soft brush to gently wash down all the internal surfaces as much as possible. Use plenty of alcohol on the brush but do not pour alcohol into the detector housing.



6. Remove the towels from under the chassis and allow the unit to dry completely. Compressed air may be used. (Be sure to wear appropriate protective equipment, especially safety goggles, and observe all standard safety practices for using compressed air.)

7. Reinstall the tube cylinder. Rotate the holddown tabs back in place and tighten securely.

8. Place the chassis on its back. Insert the plunger part way in.

   Fit the spring onto the plunger housing cap, slide the other end of the spring into the plunger, and hold the assembly fully seated while you reinstall the two screws for the plunger housing cap.

9. Return the chassis upright and slide the cover back into place. Reinstall the collar and tighten the four bolts.

   The instrument should be thoroughly performance tested.

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Nothing works like a Charm.

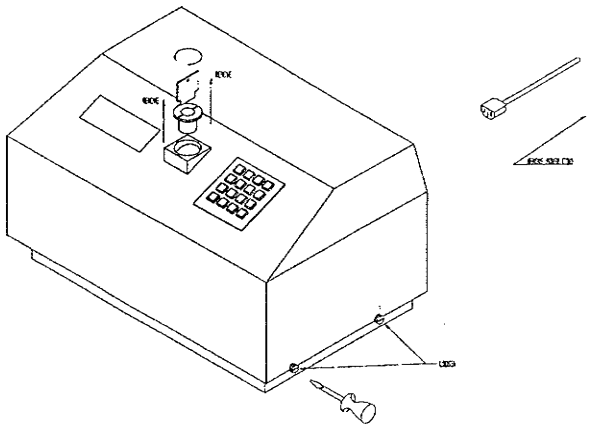
CPU Board Replacement

Tools needed:

Large flat blade screwdriver
Special 'T-Wrench' cover removal tool (supplied with unit)

1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover:

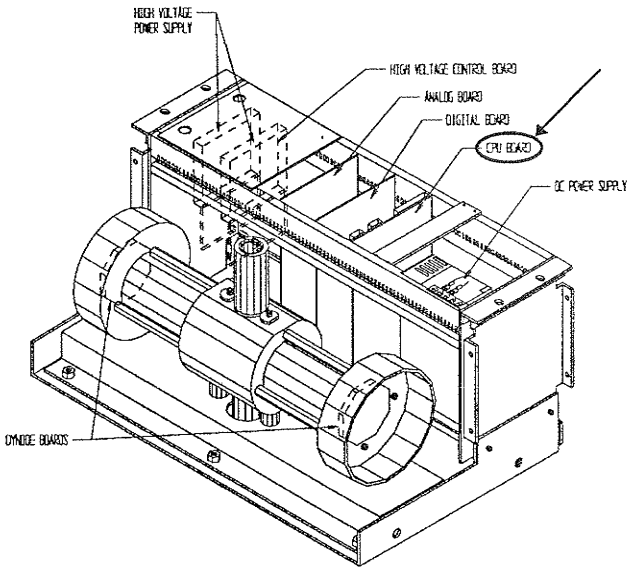


   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward.

3. Locate the CPU Board in the card cage.



   NOTE: Before touching any of the circuit boards. The service person should touch a nearby grounded object to drain off any static charge from their body.

4. Disconnect cables marked 11 & 12 from the CPU Board.

5. Carefully remove the CPU Board from the card cage by pressing on the card release while carefully pulling up on the CPU Board. Insert replacement board. Be careful the new CPU Board slides into the card guides and it push firmly into the connector the.

6. Reattach cables 11 & 12.

7. Slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.

8. Plug in the LSC6600/7600. Turn it on and test for proper operation.

LP 1/9/98

Digital Board Replacement

Tools needed:

Flat blade screwdriver (size #2)
Special 'T-Wrench' cover removal tool (supplied with unit)

1. Make a printout (if possible) of the Set-Up parameters by:

   a. With a printer connected to the LSC6600/7600, turn the unit on.

   b. It should beep twice and display the ready message.

   c. For the Utilities Menu , press and hold <SHIFT> then press <8>. Release both keys.

   D. With the printer on, press <2> <ENTER>. A detailed list of all the LSC6600/7600 parameters should printout. Save this list.

2. Turn LSC6600/7600 off and unplug from power.

3. Remove top cover (see diagram #1):

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward.

4. Locate the Digital Board in the card cage (see diagram #2).

   NOTE: Before touching any of the circuit boards. The service person should touch a nearby grounded object to drain off any static charge from their body.

5. Disconnect cables 7, 8, 9, & 10 from the Digital Board.

6. Carefully remove the Digital Board and replace with the new one.

7. Reattach cables 7, 8, 9, & 10.

8. Slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.

9. Plug in the LSC6600/7600 and turn it on. The LSC6600/7600 should beep twice and display the ready message.

10. The calibration factors must now be reprogrammed into the unit.

a. Find the calibration parameter cards in a clear pocket attached to the back panel of the LSC6600/7600.

b. Press and hold the <SHIFT> key then press the <ENTER> key. The first screen of the 'SETUP MENU' should appear.

c. Enter number for the parameter to be set by pressing the menu item number(s) then <ENTER>. Then enter the parameter value shown on the card for the appropriate menu item.

Example: For the parameter 'C14 Background'. Press <1><1><ENTER> then <x><x><ENTER>. (<x><x> means the value listed on the parameter card.)

Following are the menu item number for the set-up parameters listed on the card.

Menu Item	Parameter
7	H3 Conversion %
8	H3 Background
10	C14 Conversion %
11	C14 Background %
13	LUM Conversion %
14	LUM Background
16	H3 Low Limit
17	H3 High Limit
19	C14 Low Limit
20	C14 High Limit
22	LUM Low Limit
23	LUM High Limit

From the detailed printout taken before changing the Digital Board find the values for 'H3 Black Count', 'C14 Black Count', 'High Voltage A', 'High Voltage B' & High Voltage C'. Enter the listed number in the appropriate set-up parameter.

9	H3 Black Count
12	C14 Black Count
25	High Voltage A
26	High Voltage B
27	High Voltage C

If a detailed printout could not be taken, contact Charm Sciences Service Department.

11. Press <STOP> to return to the READY message.

12. The LSC6600/7600 is now ready for use.

/ LP 11/9/95

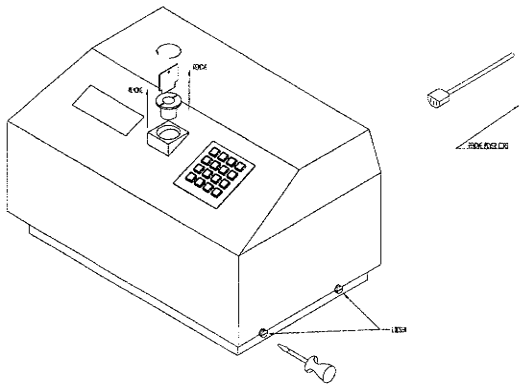
Process Control Board Replacement

Tools needed:

Flat blade screwdriver (size #2)
Special 'T-Wrench' cover removal tool (supplied with unit)

1. Turn LSC6600/7600 off and unplug from power.
2. Remove top cover (see figure 1):
   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.
   b. Loosen 4 screws on the side bottom of the top cover.
   c. Slide cover forward.
2. Locate the CPU Board in the card cage (see figure 2).

Figure 1



NOTE: Before touching any of the circuit boards. The service person should touch a nearby grounded object to drain off any static charge from their body.

3. Remove cables marked 11 & 12 going from the CPU Board to the Analog board.
4. Carefully remove the CPU Board from the card cage and replace with the Process Control Board.
5. Disconnect all remaining cables connected to the Digital and Analog boards.
6. Remove the Digital & Analog Boards. Install the Analog Board where the Digital Board was (see figure 3).
7. Remove cable 10 from the High Voltage Control Board and install the 10, 9 & 7 cables supplied with the new Process Control Board. Cable 10 High Voltage Control Board to Process Control Board and Cables 9 & 7 from the Analog Board to the Process Control Board (see figure 4).
8. Reconnect cable 5 & 6 to the Analog Board and connect cables 8, 11 & 12 to the Process Control Board.
9. Slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.
10. Plug in the LSC6600/7600. Turn it on and test for proper operation.

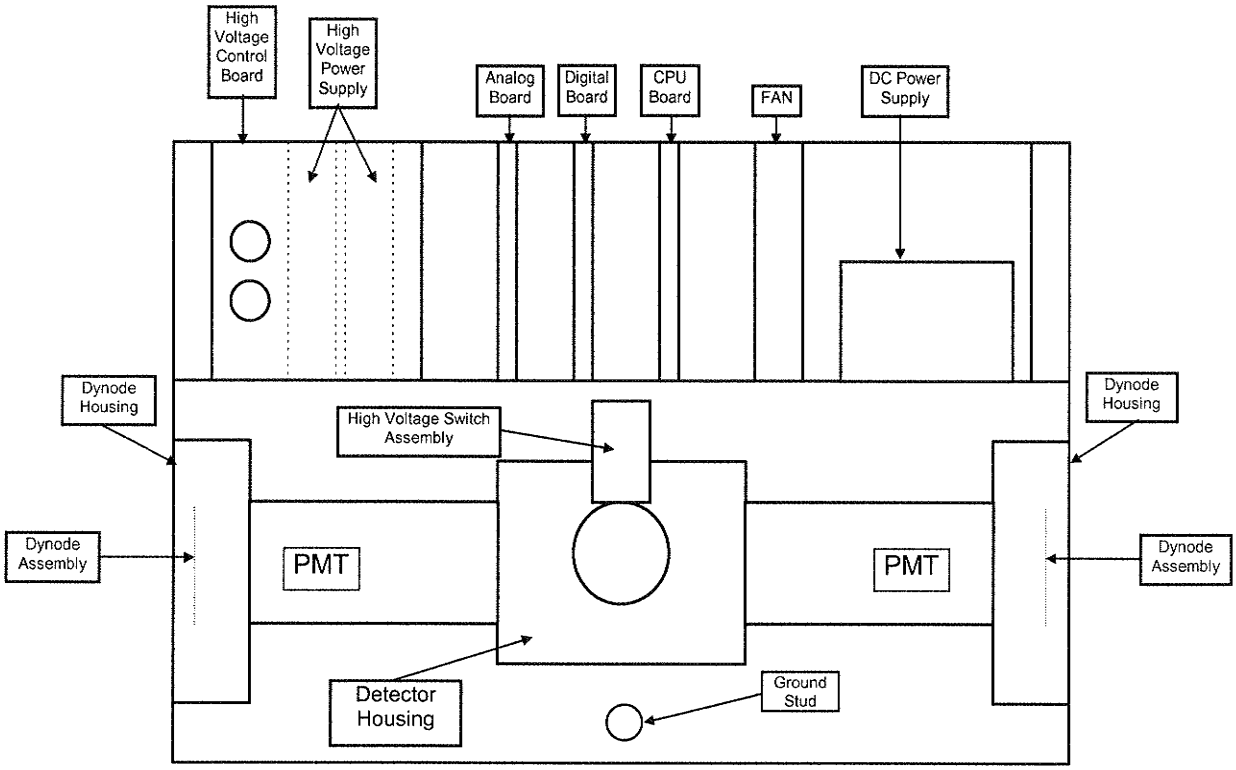


Figure 2

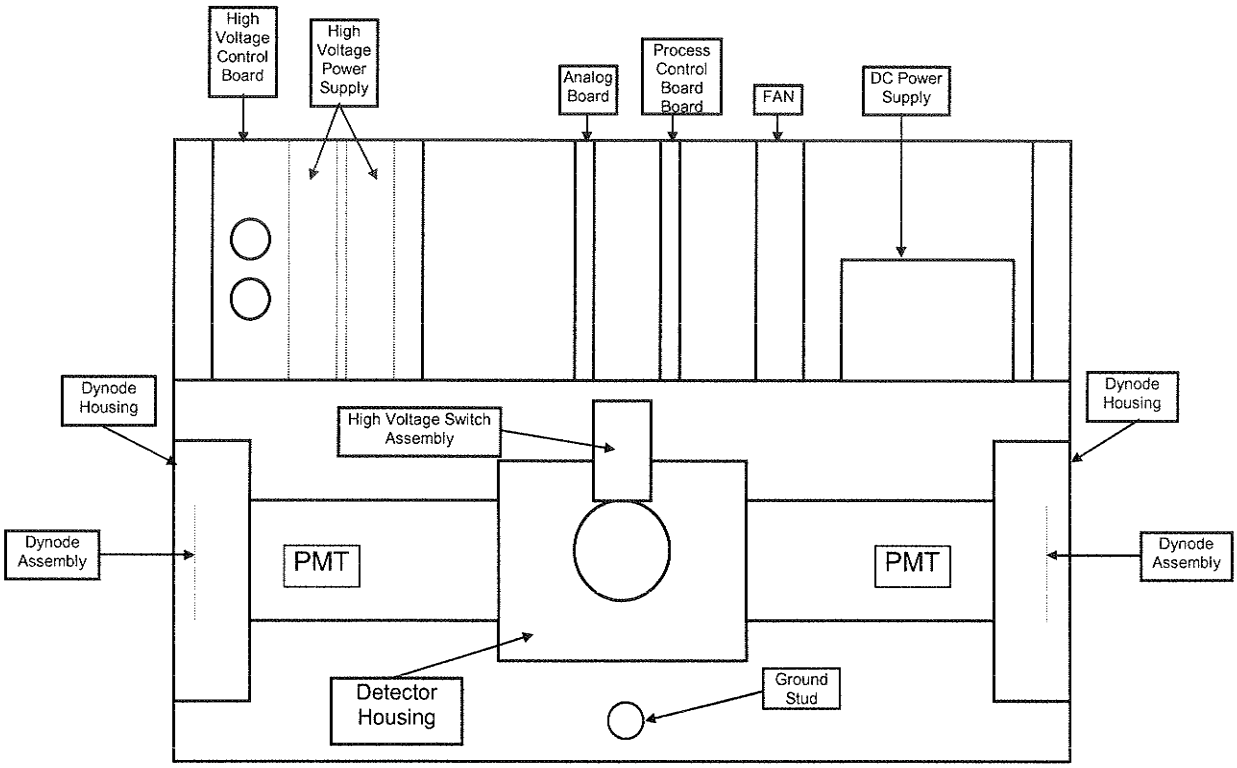


Figure 3

Process Control Board front view connector layout

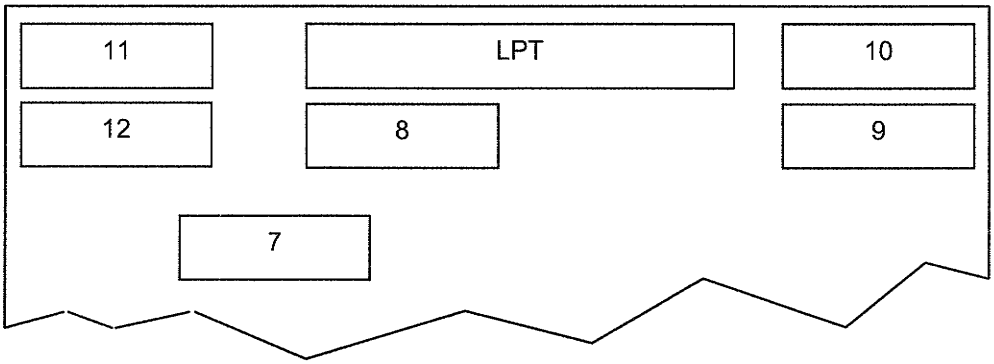


Figure 4

11. Calibration will be a little different with the Processs Control Board vs. the CPU board. To compensate for the difference, the conversion % needs adjusted by adding 6 (six) to the current number.
12. Do this by getting into the SETUP menu. With the <READY> screen displayed. Press and hold the [SHIFT] key, then press the [ENTER] key.
13. Select menu selection [7] (H3 Conversion %). Enter a new number that increases the old number by 6 (example 114 to 120).
14. Select menu selection [10] (C14 Conversion %). Enter a new number that increases the old number by 6 (example: 118 to 124).

Analog Board Replacement

Tools needed:

Flat blade screwdriver (size #2)
Special 'T-Wrench' cover removal tool (supplied with unit)

1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover (see diagram #1):

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward.

3. Locate the Analog Board in the card cage (see diagram #2).

   NOTE: Before touching any of the circuit boards. The service person should touch a nearby grounded object to drain off any static charge from their body.

4. Disconnect cables 9, 7, 5 & 6 from the Analog Board.

5. Carefully remove the Analog Board from the card cage and replace with the new one.

6. Reattach cables 9, 7, 5 & 6.

7. Slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.

8. Plug in the LSC6600/7600. Turn it on and test for proper operation.

LP 10/15/97

Replacement of Display

Tools needed:

Flat blade screwdriver (size #2)
Special 'T-Wrench' cover removal tool (supplied with unit)
5/16" hex driver

1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover (see diagram #1):

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 captive screws on the side bottom of the top cover.

   c. Carefully slide cover forward. Do not tug on the wires attached to the cover.

3. Carefully invert the cover. Disconnect the cable (11) to the display.

4. Remove the display hardware. Use a 5/16" nut driver to loosen the 4 plastic nuts holding the display to the top cover.

5. Remove the display and replace with new display in the same orientation as the old one. Secure with hardware previously removed. Reconnect display cable.

6.. Slide cover back on. Watch the cover wires do not get pinched and reinstall the cover cap and bezel. Secure the cover hardware.

8. Plug in the LSC6600/7600 turn it on .

LP 11/19/98

LSC6600/7600 PROCEDURE FOR SAMPLE CHAMBER GUIDE ASSEMBLY REPLACEMENT

Tools needed:

Large flat blade screwdriver
Special 'T-Wrench' cover removal tool
9/64" hex wrench (Allen key)
3/32" hex wrench (Allen key)

1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward. Be careful not to tug on the wires attached to the cover. Place the cover to the right side of the chassis.

3. Remove hardware for lever sensor.

   a. With the 3/32" hex wrench, remove the 2 screws and nuts holding the sensor mounted on the sample chamber guide.

   b. Place the sensor out of the way.

4. Removal and replacement of the sample chamber guide.

   a. With the 9/64" hex wrench, loosen (do not remove) the 2 screws holding the sample chamber guide.

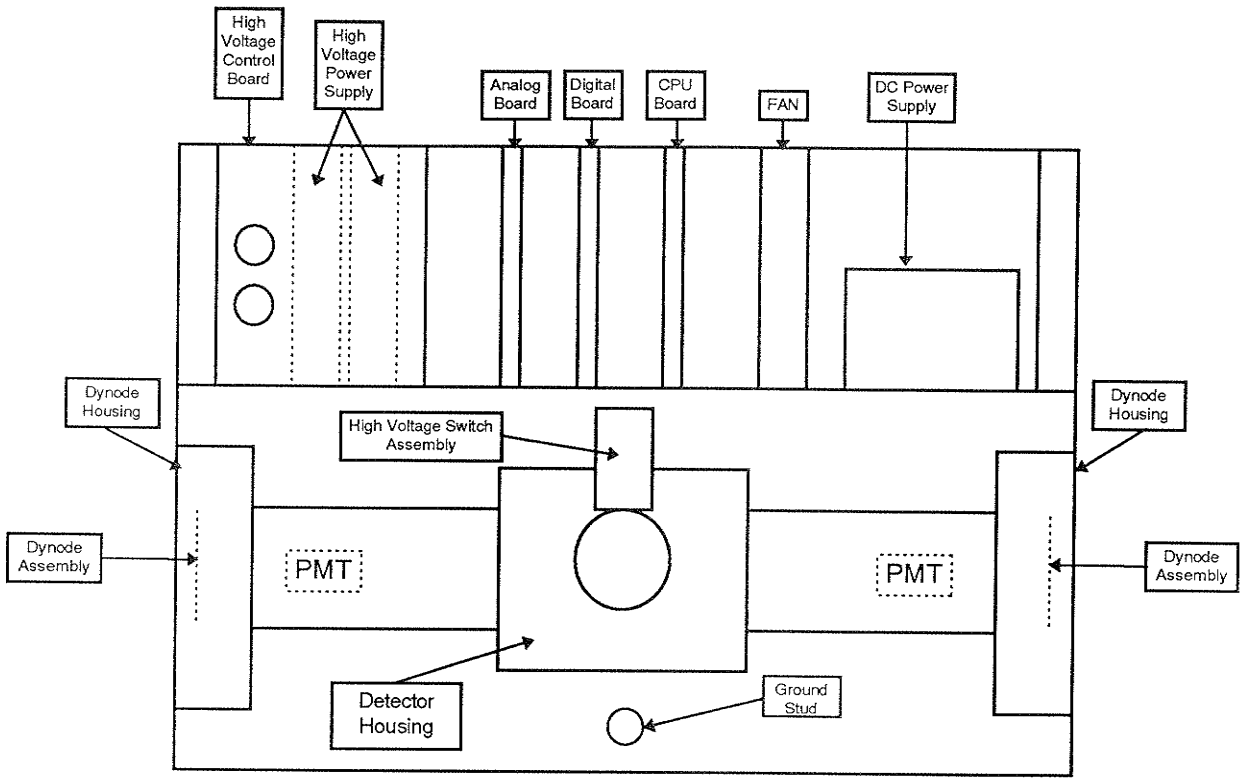
   b. Turn the 'D' shaped washers so that the flat sides are towards the sample chamber guide.

   c. Remove the sample chamber guide by slowly lifting the assembly straight up.

   d. Insert the new sample chamber guide until it goes in far enough so the 'D' shaped washers can be turned 180º into the top groove. The flat washer sides should be facing away from the sample chamber guide. Tighten the 2 screws.

   e. Remount the sensor on the new assembly. Be careful not to over-tighten the screws.

   f. Reinstall the cover. Watch that the cover wires do not get pinched. Tuck them up next to the card cage when sliding the cover back on.



8. Install the replacement Dynode Assembly onto the end of the PMT being careful that the pin gap on the PMT matches the pin gap of the Dynode assembly PMT socket. Note that both Dynode Assemblies are identical except for the wire marker labels. If you are installing a Dynode Assembly with the wrong markers, remove those and apply the ones for the old assembly. Inspect the new Dynode Assembly board to ensure that the components are not push into other parts. The upper lever of resistors should not touch the lower level.

9. Route and attach the wires as before. Wire looped in the Detector Housing should not pass over Dynode Assembly Board. Use wire ties, if available, to secure the cables around the Detector Housing.

10. Slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.

11. Plug in the LSC6600/7600. Turn it on and check for proper operation.

LP 7/14/97

Dynode/Bleeder String Assembly Replacement

Tools needed:

Flat blade screwdriver (size #2)
Phillips blade screwdriver (size #1)
Hex key 7/64"
Wrench - 9/16" or adjustable
Small wire cutters
Special 'T-Wrench' cover removal tool (supplied with unit)

1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover (see diagram #1):

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward and, without tugging hard on the cover interconnect cables, place the cover to the right side of the unit chassis.

3. Locate the Dynode Assembly to be replaced (see diagram next page).

   NOTE: Before touching any of the circuit boards. The service person should touch a nearby grounded object to drain off any static charge from their body.

4. Cut the screw mount cable tie holding the 2 signal cables (numbered 5 & 6) from the Dynode assemblies.

5. Cut the cable tie holding the 2 high voltage cables together (numbered 1 & 2 on the coax connector) and the cable tie holding the wires around the Detector Housing of the Dynode assembly to be replaced. Disconnect the appropriate connectors on the High Voltage Control Board and Analog Board.

6. Remove the top hex nut of the ground stud with the wrench and locate the shield ground wire that attaches to the Dynode assembly being replaced and remove that ring terminal from the stack.

7. With the 7/64" hex wrench, remove the screws holding cable clamps securing the wires in the Dynode Housing. Unwrap the cables from around the Detector Housing and pull the Dynode assembly from the end of the Photomultiplier Tube (PMT) and free the assembly from the unit.

Replacement of Keypad and Cable

Tools needed:

Flat blade screwdriver (size #2)
Special 'T-Wrench' cover removal tool (supplied with unit)
Phillips screwdriver (size #1)
5.5mm hex driver or wrench

1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover (see diagram #1):

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward.

   d. Disconnect cables labeled 8, 11 & 18 and remove cable hold down screw.

3. Invert the cover. Disconnect the cable (8) to the keypad. Cut the cable ties holding the Keypad Cable, being careful not to cut any wires. Remember how the wires were cable tied together so you can install new cable ties later.

4. Remove the keypad hardware. Use a 5.5mm nut driver or wrench to loosen the 4 nuts holding the keypad to the top cover.

5. Remove the Keypad and replace with new Keypad and secure with hardware previously removed.

6. Attach new Keypad Cable to Keypad and cable tie the wires as they were before and reattach cable wires with the hold down screw.

7. Plug in cables 8, 11, & 18 and slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.

8. Plug in the LSC6600/7600. Turn it on and test if faulty key is working properly.

LP 9/20/95

High Voltage Control Board Replacement

Tools needed:

Special 'T-Wrench' cover removal tool (supplied with unit)
Large flat blade screwdriver
#1 Philips blade screwdriver
1/8" flat blade screwdriver

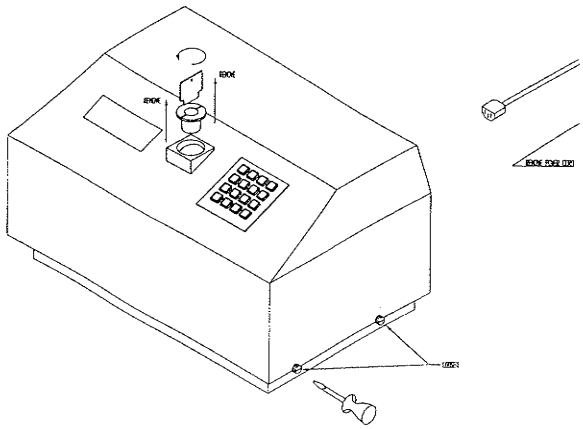
1. Turn LSC6600/7600 off and unplug from power.

2. Remove top cover:

   a. Use 'T-wrench' cover tool, found attached to the bottom of the unit, to remove the sample chamber cap and bezel.

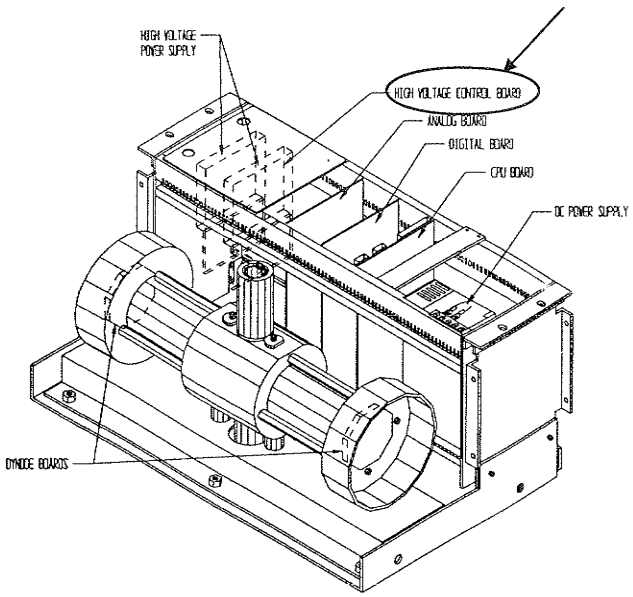
   b. Loosen 4 screws on the side bottom of the top cover.

   c. Slide cover forward.



3. Locate the High Voltage Control (HVC) Board in the card cage.

NOTE: Before touching any of the circuit boards. The service person should touch a nearby grounded object to drain off any static charge from their body.



4. Disconnect cables marked 1, 2, & 10 and unscrew the wires held by the terminal block (cable 17) from the HVC Board.

5. Remove the 6 Philips head screws holding the HVC board to the card cage.

6. Lift the HVC assembly up slightly and disconnect cable marked 16 from the bottom of the HVC Board. Remove the assembly from the card cage.

7. Remove 8 Philips head screws holding the 2 MHV connectors. Mark which connector is in No.1 & No. 2 before pulling them through the circuit board. Line up the notches in the PC board with the protrusions on the connectors and push (**DO NOT PULL BY THE WIRE**) the connectors through the board. They can be a snug fit.

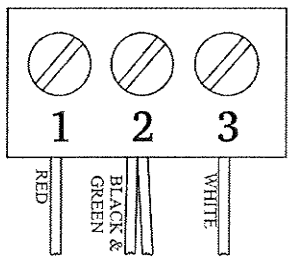
8. Remove the 4 Philips head screws near JP2 header & JP3 header holding the 2 high voltage power supplies to the HVC board and disconnect the board from the power supplies.

9. Install the replacement board in the same orientation as the old one on the high voltage power supplies and reinstall the 4 screws

10. Insert the MHV connectors through the board in the same position as removed. Line up the notches in the board with the protrusions on the connectors. Reinstall the 8 mounting screws.

11. Place the assembly back in the card cage, reconnecting cable 16 on the bottom of the board. Watch that the wires from the high voltage supplies go into support's hole at the bottom of the card cage. Reinstall the 6 mounting screws.

12. Reattach cables 1, 2,10 & 17. Connect the wires for cable 17 as shown in the diagram. Give the wires a slight tug after securing to be sure they are fixed firmly.



13. Slide cover back on. Reinstall the cover cap and bezel. Secure the cover hardware.

14. Plug in the LSC6600/7600. Turn the system on and test for proper operation.

LP 8/8/01

Subject : Unable to start or complete a count
Date : 6/14/94
Author : Engineering

Problem :

LSC6600 counter displays one of the following messages during counting :

```
-----------------------------------------

          Charm 6600 counter

            COVER is OPEN !

-----------------------------------------

          Charm 6600 counter
           H3  (CPM)=      14
           C14 (CPM)=    1200
          Count stopped

-----------------------------------------
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Causes :

These warning messages indicate one of the following :

1. The return spring needs to be adjusted.
2. The cover switch needs to be adjusted or replaced.
3. Sample holder binds not allowing complete insertion.

Diagnosis of return spring :

Inside the unit there is a spring and plunger mechanism which pushes the test tube out of the unit. These are the test procedures :

1. Remove the test tube in the test tube holder, if any.
2. Load the empty test tube holder into LSC6600.
3. Start the LSC6600 by pressing "START" button.
4. The LSC6600 should make a full 60 second count.
5. Since the count was completed without a test tube installed, the spring required adjustment.

Service procedures :

1. Remove the AC power cord and interface cable at the back of LSC6600.
2. Tip the LSC6600 backward and rest on a soft surface.
3. You will see a large round opening at the bottom of LSC6600.
4. Remove the two small screws securing a round plate to the main assembly.
5. Remove the spring from the main assembly.
6. You may have to cut off one spiral to reduce the return force of the spring with a wire cutter.
7. Re-assemble the spring, return plunger, and pin/bottom plate and secure them with the same two small screws.

8. Upright the unit. Connect the power cord and try with a capped empty test tube.
9. Ensure the TEST TUBE HOLDER is completely DOWN. If the TEST TUBE HOLDER is not completely down, you may want to repeat step 1 to 8.

Diagnosis of high voltage switch :

There is also a lever switch mechanism to ensure the sample is in the chamber before counting. These are the test procedures to confirm the problem is due to cover switch failure (alias, high voltage cutoff switch) :

1. Identify the two green high voltage indicators through the right hand side section of the vent holes at the back of the equipment.
2. Remove the test tube in the test tube holder, if any.
3. Load the empty test tube holder into LSC6600.
4. If the two green indicators did not turn on, inspect the switch for damage or misadjustment.

TEMPORARY FIX*

If the cover switch is broken, you still can get the LSC6600 to make a complete count by doing the following :

(See diagrams A & B)
1. Remove the AC power cords and interface cable at the back of LSC6600.
2. Remove the center wedge/securing ring with the T-shape handtool. This T-shape tool is attached to the AC cord as well as bottom of LSC6600.
3. Loosen the four securing screws on both sides of the bottom skirt.
4. Slide the cover forward to expose the card cage.
5. Identify the high voltage board on the left.
6. Disconnect the wires from the high voltage switch terminal block with a small screwdriver.
7. Move the red jumper from 'C' position to 'O' position on JP6.
8. Slide the cover back over the card cage.
9. Reinstall the center wedge/securing ring with the T-shape handtool.
10. Tighten the four securing screws on both sides of the bottom skirt.
11. Power up the LSC6600 and the two green indicators should be on.

The new operating procedures are as followed :

1. Before loading or removing any sample, press key [5] and wait for the following message :

Charm 6600 counter
Change sample
then
Press LSC or LUM

---

2. Remove test tube holder and load sample test tube.
3. Load test tube holder into LSC6600 and start a count.

* The disconnecting of the high voltage switch should be done only on a interim basis. A replacement switch assembly should obtained from Charm Sciences and installed. Please return the old assmenbly to Charm Sciences for failure analysis.

Replacement procedure for Cover Switch Assembly:

See diagrams A, B, C & D)

1. Remove the AC power cords and interface cable at the back of LSC6600.
2. Remove the center wedge/securing ring with the T-shape handtool. This T-shape tool is attached to the AC cord as well as bottom of LSC6600.
3. Loosen the four securing screws on both sides of the bottom skirt.
4. Slide the cover forward to expose the card cage.
5. Remove the defective Cover Switch Assembly and disconnect the wires from the high voltage switch terminal block with a small screwdriver.
6. Install new Cover Switch Assembly with the same hardware combination. Do not fully tighten the screws.
7. Slide the switch assembly up until the lever just touches the top of the hole through the main cylinder and tighten both screws.
8. Identify the high voltage board on the left.
9. Insert the wires from the high voltage switch assembly into the high voltage switch terminal block and tighten its screws with a small screw driver as follows :
   Position 1 - Red wire
   Position 2 - Green and black wires
   Position 3 - White wire
10. Ensure the red jumper is on the 'C' position on JP6.
11. Ensure that the lever on the switch assembly moves smoothly.
12. Slide the cover back over the card cage.
13. Reinstall the center wedge/securing ring with the T-shape handtool.
14. Tighten the four securing screws on both sides of the bottom skirt.
15. Reinstall the AC power cord.
16. Power up the LSC6600 and the two green indicators should be on.

Diagnosis of Tube Holder Guide
---

1. When inserting the sample holder it does not easily seat into the sample chamber. It should slide smoothly in and out without binding.

Replacement procedure for Tube Holder Guide Assembly:

See diagrams A, B, C & E)

1. Remove the AC power cords and interface cable at the back of LSC6600.
2. Remove the center wedge/securing ring with the T-shape handtool. This T-shape tool is attached to the AC cord as well as bottom of LSC6600.
3. Loosen the four securing screws on both sides of the bottom skirt.
4. Slide the cover forward to expose the card cage.
5. Loosen two socket head screws holding the Tube Holder Guide.
6. Turn 'D' washers so that the flat side is towards the Tube Holder Guide.
7. Disconnect the wires of the Cover Switch Assembly on the Tube Guide Holder Assembly from the high voltage switch terminal block with a small screwdriver.
8. Remove Tube Holder Guide Assembly and return it to CHARM SCIENCES.
9. Install new Tube Holder Guide and attach Cover Switch Assembly (if necessary) according to the previous instructions.
10. Turn 'D' washers so that the flat side is away from the Tube Holder Guide and tighten the two screws.
11. Identify the high voltage board on the left.
12. Insert the wires from the Cover Switch Assembly into the high voltage switch terminal block and tighten its screws with a small screw driver as follows :
    Position 1 - Red wire
    Position 2 - Green and black wires
    Position 3 - White wire

13. Ensure that the lever on the switch assembly moves smoothly.
14. Slide the cover back over the card cage.
15. Reinstall the center wedge/securing ring with the T-shape handtool.
16. Tighten the four securing screws on both sides of the bottom skirt.
17. Reinstall the AC power cord.
18. Power up the LSC6600 and the two green indicators should be on.

Service Note - LSC6600/7600

2/3/1997

Problem: Analyzer resets. Can occur during a count (count stops, the unit beeps twice and the <READY> message displays) or while unattended (the units will beep twice and the <READY> message displays.)

Cause: +5v DC power to the backplane is low (<4.8v.) The connector contact resistance is high due to oxidation of the contact surface, caused by the high current draw of the CPU board.

Fix: Move the backplane +5v and DC return sources from the connector to the terminal block on the DC power supply.

Procedure: Materials needed.

Charm T-Wrench (or equivalent tool)
Large flat blade screwdriver
3/16" flat blade screwdriver
Volt-Ohm meter
Crimping tool
Wire strippers
#6 blue spade (fork) solderless terminal
#6 red spade (fork) solderless terminal
Red butt splices (if required, 2)
#18 awg red hookup wire (if required, approx. 3")
#18 awg black hook-up wire (if required, approx. 3")

1. Disconnect power from the rear if the analyzer.
2. Loosen 4 captive screws on the side bottom of the cover with the large flat blade screwdriver.
3. With the Charm T-Wrench, remove the sample tube guide cap.
4. Slide cover forward and place cover to the right of the unit. Be careful not to tug on wires.
5. Locate the DC power supply in the right side of the card cage and disconnect the 10 position white connector (cable label 15).
6. Disconnect cables 1, 2 & 10 from the High Voltage Control board located on the left of the card cage.
7. On the High Voltage Control board, locate the solder pads for connector/cable 16. With a Ohm Meter check for continuity on the pads marked GND to both of the black wire connections on the DC power supply connector/cable 15. Whichever one you get continuity with EJECT THE **OTHER** BLACK WIRE CONNECTOR CONTACT from the connector/cable 15 housing. Eject it by pushing down the tab of the appropriate contact in the long rectangular slot on the back of the connector housing body and pulling on the correct wire.
8. Repeat the same procedure with the +5 on the High Voltage Control board and the red wires on the connector/cable 15. Then cut the contacts off of the 2 removed wires and strip back about 3/8" of insulation from each wire.

9. On the DC power supply, loosen the first 2 left side screws of the terminal strip. From the 2nd left terminal pull out the green wire (labeled 22). Cut the solderless terminal off of the green wire and strip approx. 3/8" insulation form the wire. If the black wire previously stripped is long enough to easily reach 2nd left terminal combine it with green wire in a #6 blue spade solderless terminal and crimp it. If the black wire is too short, add approx. 3" of 18 awg black hook-up wire (stripped 3/8" each end) to the black wire using the red butt splice. Then combine it with the green wire in a #6 blue spade solderless terminal. Insert the solderless terminal into the 2nd left terminal and tighten the screw.

10. If the red wire previously stripped is long enough to easily reach the 1st terminal, install a #6 red spade solderless terminal and insert the solderless terminal into the 1st left terminal. If too short, add approx. 3" of red 18 awg hook-up wire as in the previous step.

11. Reconnect the 1, 2 & 10 cables to the High Voltage Control board and the white connector back onto the DC power supply (watch the connector properly lines up with power supply mating pins.)

12. Slide the cover back on watching that the cover tuck between the card cage and the PMT assembly.

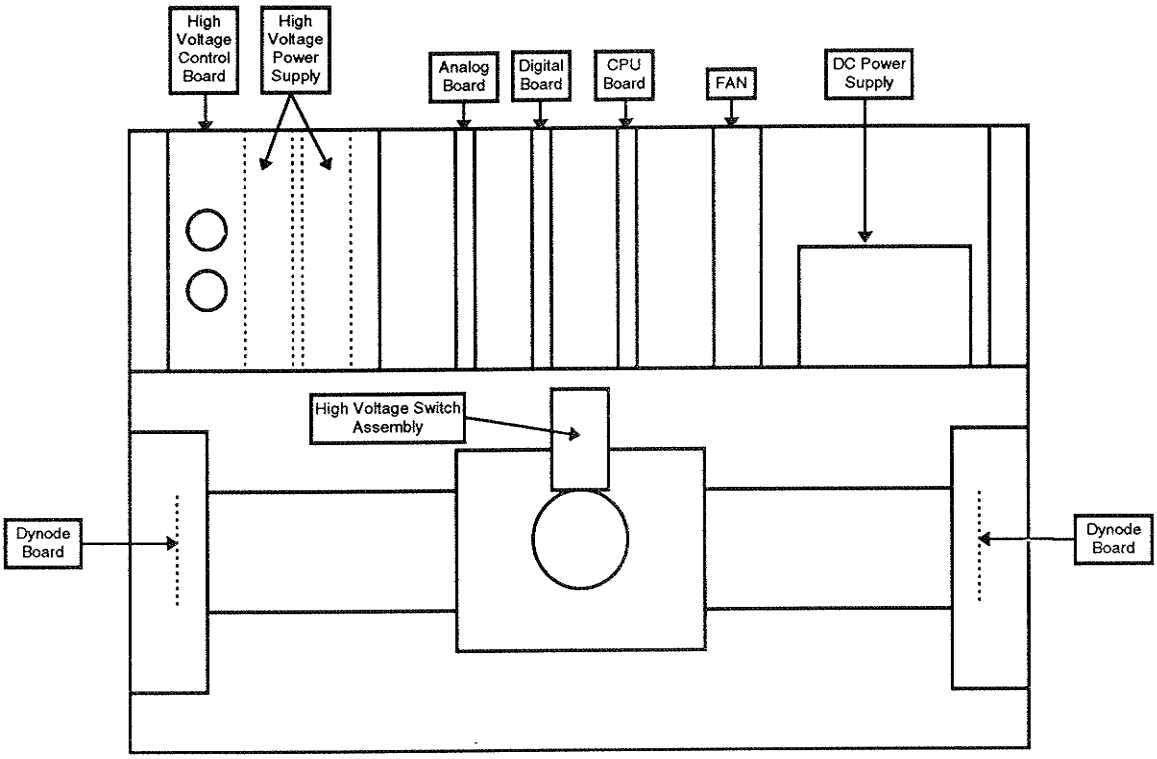
13. Reinstall the sample tube guide cap and tighten the cover screws.

14. Plug the unit in and turn it on.

Replacement procedure for Cover Switch:
---

1. Remove the AC power cords and interface cable at the back of LSC6600.
2. Remove the center wedge/securing ring with the T-shape handtool. This T-shape tool is attached to bottom of LSC6600/7600.
3. Loosen the four securing screws on both sides of the bottom skirt. Slide the cover forward to expose the card cage.
4. Remove the stop nut on the HV switch lever screw.
5. Remove the socket head screw securing the lever. Note where the flat washers are in relation to the HV switch lever.
6. Install new HV switch lever. Slip washers and HV lever over screw. Thread screw into bracket hole and tighten until the parts come together. Lever should be free to pivot on screw. Thread stop nut onto extended screw thread. Tighten firmly but do not over tighten. The threads in the bracket may strip.
7. Test that the lever moves freely when the sample holder is inserted and removed. Adjust screw tightness, if necessary.
8. Reinstall cover.
9. Insert AC power cord and switch unit on.

LSC6600/7600 Troubleshooting Guide



I. No Counts

Analog Board
PMT
Dynode Board
Digital Board
High Voltage Control Board
High Voltage Power supply
Cable 10
Cable 7
Cable 9

II. Low Counts

PMT
Analog Board
Dynode Board
Digital Board

DRAFT

LSC6600/7600 Troubleshooting Guide

III. No Display

CPU Board
Display
Display Cable
Display power Cable
DC Power supply

IV. Won't Boot Up (Doesn't beep twice about 5 sec. after power applied)

Power Cord
Fuse
CPU Board
DC Power Supply

V. 'COVER OPEN' errorr message

HV switch lever
HV lever sensor
High Voltage control board
Digital Board
CPU Board

VI. Keypad Does Not Respond

Digital Board
Keypad cable
Keypad

DRAFT

Procedure for CHARM II LSC6600/7600 Calibration

This procedure is intended rough calibration only after PMT replacement in the field. It does not wholly represent the full calibration steps performed at the Charm Sciences facility in Lawrence, MA USA. When completed, it may not give similar typical count readings as supplied with Charm assay kits.

Items needed for calibration:

H3 high sample – approx. 15,000 CPM
H3 test sample – 3200 CPM ±10%
C14 test sample – 1800 CPM ±10%
CPU EPROM set version 2.13 (if not already installed) or
Process Control Board with version 3.07
Serial printer and cable – set to 9600,N,8,1 communications

See page 4 for sample making procedure

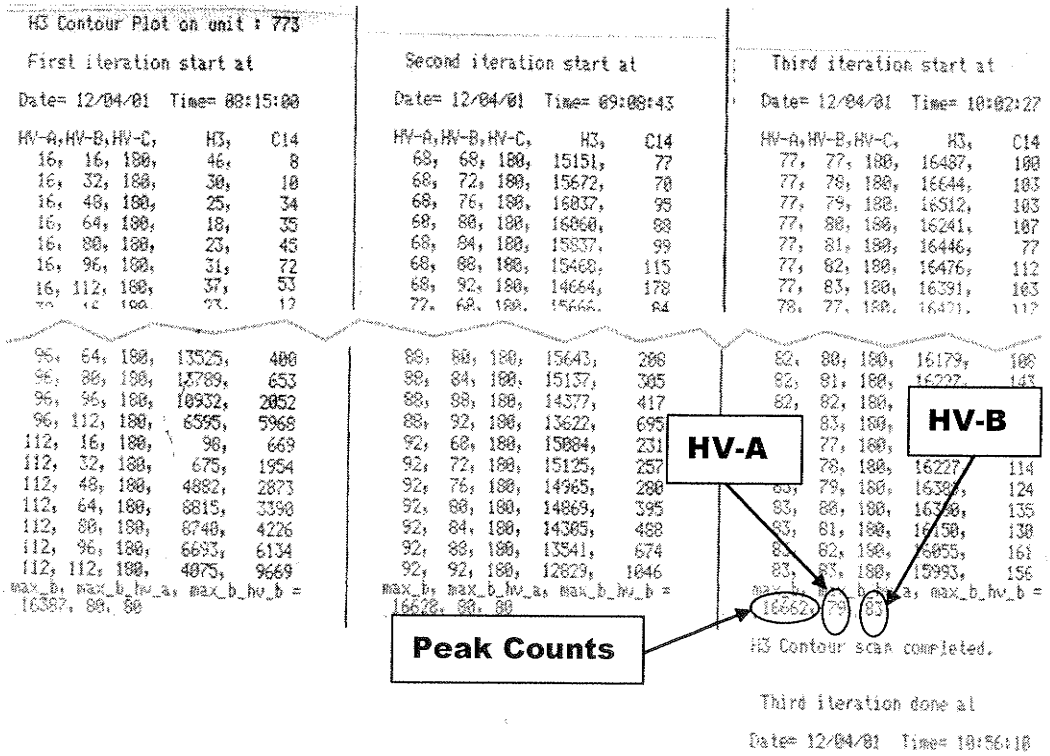
1. Once the PMTs are replaced and the analyzer reassembled. Allow the unit to sit idle for at least couple hours (preferably overnight) to let the PMTs settle down after exposure to ambient light.
2. Power unit on. Go into the 'SETUP' menu (SHIFT + ENTER). Press '1' then ENTER to select 'RESET TO DEFAULTS'. Answer 1 [YES] to perform the action.
3. Go back into the 'SETUP' menu and change the following parameters to these values:

Menu #	Parameter	Value
#4	Printout style	4
#9	H3 black count	0
#12	C14 black count	0
#16	H3 Low Limit	12
#17	H3 High Limit	75

4. Set parameter #27 according to a value determined from the listed voltage listed on the PMT box label for 'VOLTS @ 2000A/lm':

Volts @ 2000A/lm	#27 HV-C		Volts @ 2000A/lm	#27 HV-C
800-850	140		1050-1100	190
850-900	150		1100-1150	200
900-950	160		1150-1200	210
950-1000	170		1200-1250	220
1000-1050	180		1250-1300	230

5. Exit SETUP. Insert 'H3 high sample' into the sample chamber. Make sure the printer is connected and on. Go to the 'DIAGNOSTICS' menu (SHIFT + 9). Run 'H3 Contour Plot' (menu selection 1). This test will run about 3 hours.
6. At the conclusion of the test, look at the third iteration results on the printout. The values for HV-A & HV-B should be between 50 and 100. The MAX CPM should be 12,000 to 18,000 CPM.



7. Repeat the H3 Contour test. Compare the numbers of HV-A, HV-B to the first test and they should be ±5. For example, the first plot has HV-A = 70 and HV-B = 55 and the second plots has HV-A = 66 and HV-B = 58. If not, repeat H3 Contour plot test again. Compare the third plot with the 2 previous plots. Match it up with the one that is ±5.
8. Set the readings of HV-A and HV-B of the last H3 Contour plot in parameters 25 & 26 of the 'SET-UP' menu. Then set parameter 16 back to 22 and 17 back to 95. Change parameter 27 (HV-C Voltage) to N+5. In other words, whatever the value is presently set in 27 (i.e. 170),
9. Remove the 'H3 high' sample and insert the 'H3 test' sample into the chamber. Go to the 'DIAGNOSTICS' menu and select 19 (Scan hv-c) to run. When completed, in about 20 minutes, remove the 'H3 test' sample and insert the 'C14 test' sample. Run the same test again (Scan hv-c).

10. The results of the 2 scans will be used to determine the final setting of the HV-C. Examine the printouts and find a point where about the 'C14_CT%' on the C14 sample scan is 19.00 to 21.00 and 'H3_CT%' on the H3 scan is 4.00 to 5.50. This point should have the same 'HVC' number for both H3 & C14 scans. Enter the common number in parameter 27 of the 'SET-UP' menu.

H3 & C14 scan plot on unit : 773
Scanning on HV-C.

High voltage C scan starts at:

Date= 12/04/01 Time= 14:17:53

HVC,	H3,	C14,	H3_CT%	C14_CT%
175,	3296,	83,	2.52	3971.08
176,	3426,	83,	2.60	3849.44
177,	3592,	78,	2.17	4605.13
178,	3668,	91,	2.49	4021.98
179,	3945,	77,	1.95	5123.38
180,	4062,	97,	2.39	4187.63
181,	4096,	98,	2.40	4173.47
182,	4176,	95,	2.27	4395.79
183,	4202,	184,	2.48	4040.38
184,	4419,	117,	2.65	3776.92
185,	4549,	102,	2.24	4459.80
186,	4568,	95,	2.00	4800.00
187,	4497,	136,	3.02	3306.62
188,	4658,	136,	2.96	3375.36
189,	4687,	153,	3.32	3011.11
190,	4656,	159,	3.42	2924.53
191,	4615,	171,	3.71	2638.83
192,	4538,	157,	4.35	2799.49
193,	4563,	251,	5.13	1949.35
194,	4546,	294,	6.47	1546.26
195,	4418,	340,	7.70	1299.41

H3 & C14 scan plot on unit : 773
Scanning on HV-C.

High voltage C scan starts at:

Date= 12/04/01 Time= 13:54:20

HVC,	H3,	C14,	H3_CT%	C14_CT%
175,	1828,	1554,	151.17	66.15
176,	932,	1563,	167.70	59.63
177,	888,	1569,	176.69	56.60
178,	839,	1695,	202.03	49.50
179,	835,	1681,	201.32	49.67
180,	738,	1839,	249.19	40.13
181,	764,	1839,	240.71	41.54
182,	658,	1898,	286.88	34.87
183,	625,	1885,	301.60	33.16
184,	575,	1954,	341.01	29.32
185,	624,	2081,	333.49	29.99
186,	632,	2105,	333.07	30.02
187,	574,	2218,	385.02	25.97
188,	539,	2230,	413.73	24.17
189,	581,	2217,	442.51	22.60
190,	533,	2254,	422.89	23.65
191,	429,	2276,	530.54	18.85
192,	478,	2362,	481.59	20.76
193,	458,	2383,	520.31	19.22
194,	439,	2310,	526.20	19.00
195,	420,	2399,	568.48	17.59

11. Remove the sample from the sample holder and reinsert the sample holder back in the sample chamber without a test tube. Go to the 'DIAGNOSTICS' menu and perform a multiple count of 20 to determine the 'BLACK COUNT'. Press '14' for Multiple Count, press ENTER for 20 (default) multiple counts and press 1 for 'H3 or C14' (60 second) counts.

12. The C14 & H3 average results should then be entered into the appropriate parameters in the 'SETUP' menu. The H3 average is programmed into parameter 9, 'H3 Black Count'. The C14 average is programmed into parameter 12, 'C14 Black Count'.

Multiple LSC plot on : 634
Tue Jan 6 14:10:05 1998

ID= 141 Time= 60 1591 22
ID= 142 Time= 60 1550 64
ID= 143 Time= 60 1613 41
ID= 144 Time= 60 1577 58
ID= 145 Time= 60 1611 45
ID= 146 Time= 60 1561 44
ID= 147 Time= 60 1550 26

ID= 168 Time= 60 1547 66

H3 summaries :
Average = 1562
Maximum = 1622
Minimum = 1495
Range = 127
Count = 20
S.Deviation = 36
Crosstalk % = 2.75

Conversion% = 97
Background = 25
Blackcount = 1

C14 summaries :
Average = 43
Maximum = 69
Minimum = 22
Range = 47
Count = 20
S.Deviation = 13
Crosstalk % = 3632.56

Conversion% = 101
Background = 65
Blackcount = 18

Multiple LSC plot on : 634
Mon Dec 22 09:33:34 1997

ID= 81 Time= 60 338 1413
ID= 82 Time= 60 345 1497
ID= 83 Time= 60 353 1429
ID= 84 Time= 60 332 1336
ID= 85 Time= 60 368 1361
ID= 86 Time= 60 352 1405

ID= 100 Time= 60 332 1406

H3 summaries :
Average = 358
Maximum = 387
Minimum = 327
Range = 60
Count = 20
S.Deviation = 17
Crosstalk % = 398.86

Conversion% = 97
Background = 25
Blackcount = 1

C14 summaries :
Average = 1396
Maximum = 1497
Minimum = 1336
Range = 161
Count = 20
S.Deviation = 41
Crosstalk % = 25.87

Conversion% = 101
Background = 65
Blackcount = 18

13.

Multiple LSC plot on : 634
Mon Dec 8 16:25:32 1997

ID= 13 Time= 60 3 17
ID= 14 Time= 60 2 21
ID= 15 Time= 60 0 14
ID= 16 Time= 60 2 26
ID= 17 Time= 60 1 21

ID= 32 Time= 60 0 17

H3 summaries :
Average = 1
Maximum = 3
Minimum = 0
Range = 3
Count = 20
S.Deviation = 1
Crosstalk % = 1000.00

Conversion% = 100
Background = 0
Blackcount = 0

C14 summaries :
Average = 18
Maximum = 26
Minimum = 12
Range = 14
Count = 20
S.Deviation = 4
Crosstalk % = 5.56

Conversion% = 100
Background = 0
Blackcount = 0

Procedure for making Charm II test sample for rough field calibration of analyzer

For C14:

Take a Charm II milk TBL8 tracer tablet (yellow tablet) and add it to a clean test tube.
Add 0.3ml of water, mix to dissolve tablet completely.
Add 3.0ml of Optifluor solution to tube. Cap and mix thoroughly.

Depending on the Lot # of TBL8 tablets if the above solution is counted on a Charm II 6600 analyzer you should get a C14 count approximately = 6500.

For calibration of a set of PMT's a value of 1800cpm needs to be obtained.
To get this value:
Take 0.8ml of the above solution and put it into a clean test tube and count. You should get a value close to the desired 1800cpm.

For H3:

Take a Charm II milk SULFA tracer tablet (pink tablet) and add it to a clean test tube.
Add 0.3ml of water, mix to dissolve tablet completely.
Add 3.0ml of Optifluor solution to tube. Cap and mix thoroughly.

Depending on the Lot # of SULFA tablets, if the above solution is counted on a Charm II 6600 analyzer you should get a H3 count = 33000.

For calibration of a set of PMT's a value of 15000cpm and 3200cpm is needed.

To get 15000cpm:
Take 1.5ml of the above solution and put it into a clean test tube and count. You should get a value close to the desired 15000cpm.

To get 3200cpm:
Take 0.3ml of the original solution and put it into a clean test tube and count. You should get a value close to the desired 3200cpm.

Charm II 6600/7600 Analyzer - Internal Settings Confirmation Instructions

The internal settings of the Charm II 6600/7600 analyzers are factory calibrated. If these settings are accidentally set to the default values, results will be affected. To confirm that these setting have not inadvertently been changed follow the instructions below:

- Locate the index card on the back of the analyzer. It will be found inside a clear plastic sleeve attached to the back of the analyzer. This will detail the internal settings that should be stored as values in the analyzer and will include a list of approximately 18 values. Refer to the list below for comparison. The first item should be the H3 conversion percent.
- Enter the Setup Menu in the analyzer. To enter the Setup Menu hold down the SHIFT and ENTER keys together. Release them both at the same time and the Setup Menu should appear on the analyzer display.
- Locate the settings in the analyzer that correspond to the items on the index card. Press the ENTER key to move through the different settings. Only 3 settings at a time will be displayed on the analyzer screen. Press the ENTER key until the #7 appears on the screen. This should be the H3 Conversion %. Press the #7 and then ENTER on the analyzer keypad to view the current H3 Conversion % setting in the analyzer. Check the card to make sure the value in the analyzer correctly matches the value on the index card. If they are the same press the STOP key to return to the Setup Menu. If they are different, enter in the correct value as it appears on the index card and press ENTER. The analyzer should display the new value. Press the STOP key to return to the Setup Menu.
- Check each of the items listed on the index card. Repeat the same procedure as above checking each value that appears on the index card.

The following list should be on the index card located on the back of the analyzer and needs to be compared to the values that appear under each item in the analyzer. Note that #'s 18, 21, and 24 do not appear on the card and will not need to be adjusted in the analyzer.

#7	H3 Conversion %
#8	H3 Background
#9	H3 Black Count
#10	C14 Conversion %
#11	C14 Background
#12	C14 Black Count
#13	Lum Conversion %
#14	Lum Background
#15	Lum Coin Level
#16	H3 Low Limit
#17	H3 High Limit
#19	C14 Low Limit
#20	C14 High Limit
#22	Lum Low Limit
#23	Lum High Limit
#25	HVA (High Voltage A)
#26	HVB (High Voltage B)
#27	HVC (High Voltage C)

Contact Charm Sciences Technical Service with any questions or concerns at (978) 687-9200 or email at support@charm.com.

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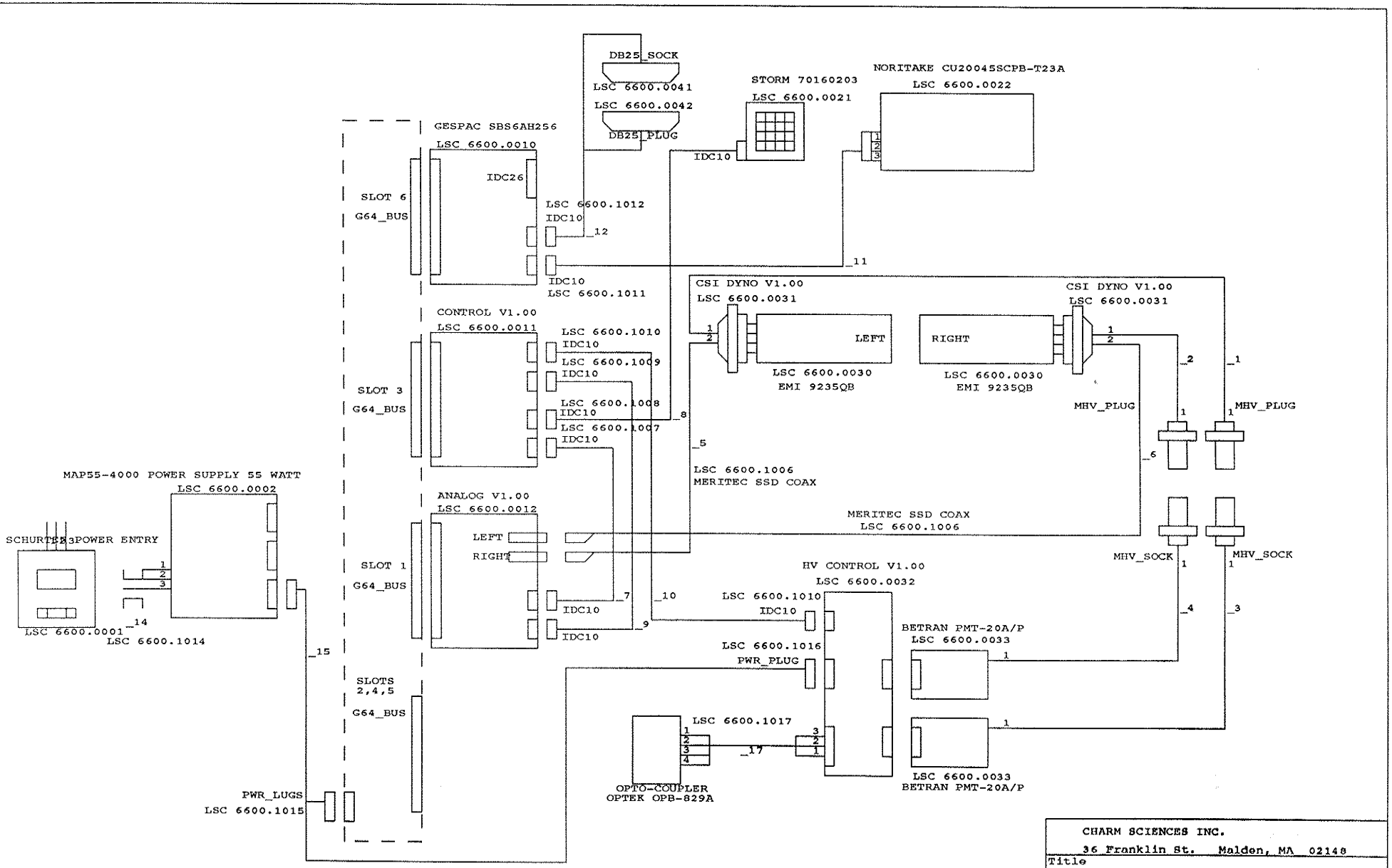


CHARM SCIENCES INC.		
36 Franklin St. Malden, MA 02148		
Title: WIRING DIAGRAM FOR LSC6600		
Size: B	Document Number: LSCWIRE.SCH	REV: 01
Date: April 7, 1992	Sheet 1 of 1	

LSC6600 ASSEMBLY PROCEDURE

Fan Assembly

Materials

1	LSC199 Fan mounting bracket
1	Fan (PAPST)
2	Finger guards (PAPST)

Hardware

2	6-32x1-1/2" philips pan head
2	6-32x1-3/8" philips pan head
6	#6 flat washer
4	#6 split lock washer
4	6-32 cap (acorn) nut

DC Power Supply Assembly

Materials

2	LSC189 Power supply bracket
2	LSC195 Power supply insulator
1	Power supply (POWER ONE)

Hardware

2	#6 shoulder washer, Keystone p/n 3054
2	6-32x3/8" philips pan head
2	4-40x3/8" philips oval head (DCPS cover)
2	6-32 split lock washer

HV Power Supply (HVPS) Assembly

Materials

1	HVC board
2	HV power supplies (BERTAN)

Hardware

8	3-56x3/16" philips pan head
4	4-40x1/2" philips pan head
1	6-32x1-3/4" philips pan head
1	6-32 KEP nut
1	#6 clearance 1-1/2" aluminum standoff

Card Cage Assembly

Electro-Space parts

2	Side panels
4	Rails
4	Threaded strips
4	Number strips
2	Mounting brackets
1	Screen panel
6	Card guide - locking
6	Card Guide - non-locking

Materials

1	LSC185 HVPS plate
1	HVPS assembly
1	DCPS assembly
1	Fan assembly
1	Backplane (GESPAC)
1	Power line filter (DELTA)
1	LSC1014 AC input to Power line filter cable
1	LSC1015 DCPS output cable
1	LSC1018 Display/fan power cable
1	LSC1020 Power line filter to DCPS input cable
1	LSC1022 DCPS common to chassis ground wire

Hardware

2	6-32x1/4" philips pan head
2	6-32 kep nut
26	M2.5x10mm philips pan head
4	8-32x1/4" philips flat head (supplied w/card cage)
16	6-32x3/8" philips flat head self tapping (supplied w/card cage)

HV Sample Switch Assembly

Materials

1	LSC181 HV switch lever
1	LSC182 HV switch bracket
1	LSC183 HV switch lever bracket
1	LSC1017 Opto-switch assembly

Hardware

1	4-40x3/4" aluminum standoff
6	4-40x3/8" socket head
3	4-40 KEP nut
1	#4 Flat washer - brass

Tube Holder Assembly

Materials

1	LSC172 tube holder cap
1	LSC170 Tube holder tube
1	LSC171 Tube holder spring retainer
1	LSC178 Holder spacer
4	Tube holder springs

Plunger Housing Assembly

Materials

1	LSC230 plunger housing
1	LSC232 plunger housing cap
1	LSC116 plunger
1	Plunger spring

Hardware

2	4-40x5/8" philips head
2	#4 split lock washer

PMT Holder Assembly

Materials

1	LSC105 reflector
2	LSC119 tube sleeve
2	Magnetic shield
2	LSC104 main tube
2	LSC193 PMT retaining ring
2	LSC228 mounting washer
1	LSC126 support ring
2	LSC134 end cap
4	LSC226 clamp ring
1	Plunger assembly
1	Tube holder guide
1	HV sample switch assembly
1	LSC141 assembly support base
2	LSC130 assembly standoff
2	PMTs (EMI 9235QB12)
2	Light shield

Hardware

2	1/4-20x1" socket head
2	1/4" split lock washer
4	8-32x1/2" socket head
2	4-40x5/8" philips pan head
2	#4 split lock washer
2	#4 flat washer
8	8-32x3/8" philips pan head
8	#8 external tooth lock washer
8	8-32x3-1/2 M/F aluminum standoff (2 modified w/less threads)

Main Chassis Assembly

Materials

1	LSC140 base plate
2	LSC156 electronics card rack bracket
4	LSC187 case foot spacer

Hardware

2	1/4-20x1-1/2" socket head
2	1/4-20x1" socket head
4	1/4-20 KEP nut
4	Rubber feet
4	1/4 fender washer
4	8-32x3/8" socket head
4	8-32 KEP nut

Back Plate Assembly

Materials

1	LSC140 back plate
1	LSC188 filler plate
1	LSC1012 Communication cable
1	LSC1021 AC input chassis ground wire
1	Power entry module
1	Fuse drawer
2	1-1/2 Amp 3AG fuses

Hardware

6	Jack screws 4-40x7/16"
6	#4 split lock washer
6	#4 flat washer
6	4-40 nut (3/16" flat)
2	4-40x3/8" philips oval head
2	4-40 KEP nut
1	1/4-20x1" brass hex head
2	1/4-20 brass hex nut
2	1/4 brass flat washer
3	1/4 SS external tooth lock washer
1	1/4 Bronze split lock washer
1	1/4 nylon shoulder washer
1	1/4 nylon flat washer

Cover Assembly

Material

1	LSC155 Base mounting bracket
1	LSC142 Outer case
1	Display (NORITAKE)
1	Keypad w/legend tiles (STORM)
1	LSC1008 Keypad cable
1	LSC1011 Display cable

Hardware

4	#6-32 nylon hex nut
4	#6 clearance 5/16" nylon standoff, HH Smith p/n 4010
4	#6 flat washer
4	M3 nut
4	M3 flat washer
4	M3 split lock washer
7	8-32 KEP nut
7	#8 flat washer

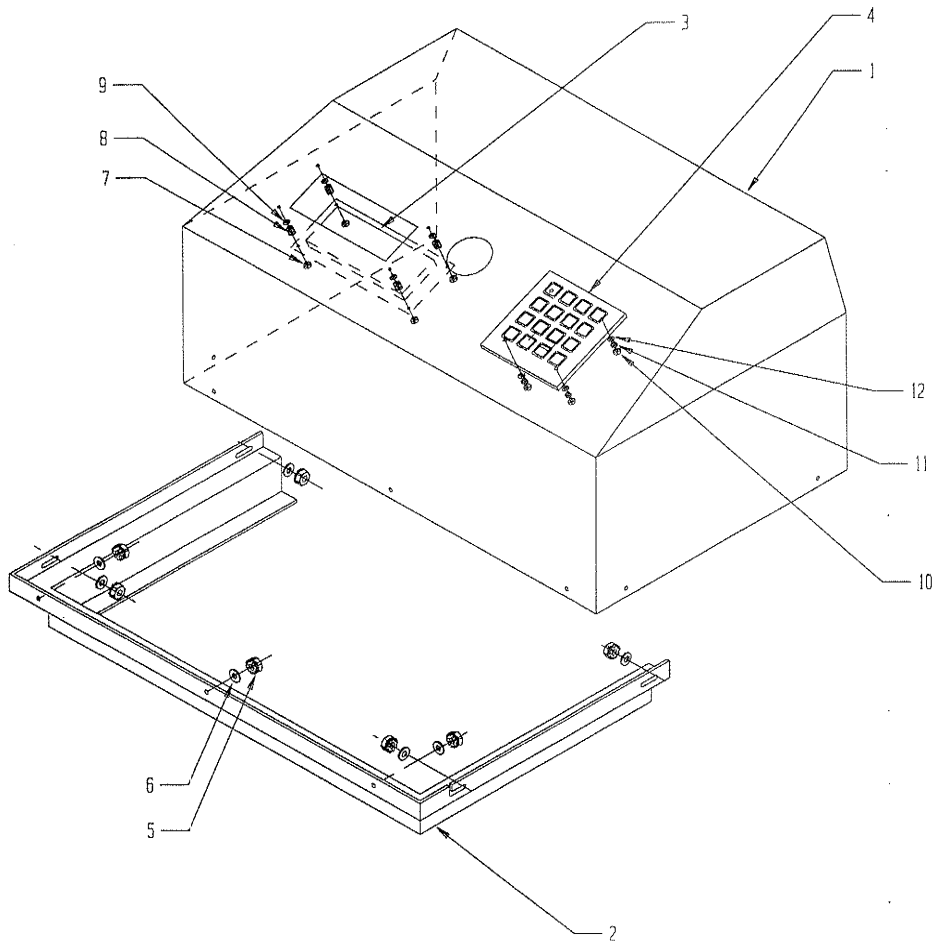
Final Unit Assembly

Materials

2	LC191 assembly spacer
1	PMT assembly
1	Back plate assembly
1	Cover assembly
2	Dynode board assemblies
1	Card cage assembly
1	Analog board assembly
1	Digital board assembly
1	Computer board
1	LSC1007 digital to analog board cable
1	LSC1008 digital to analog board cable
1	LSC1011 HVC to digital board cable

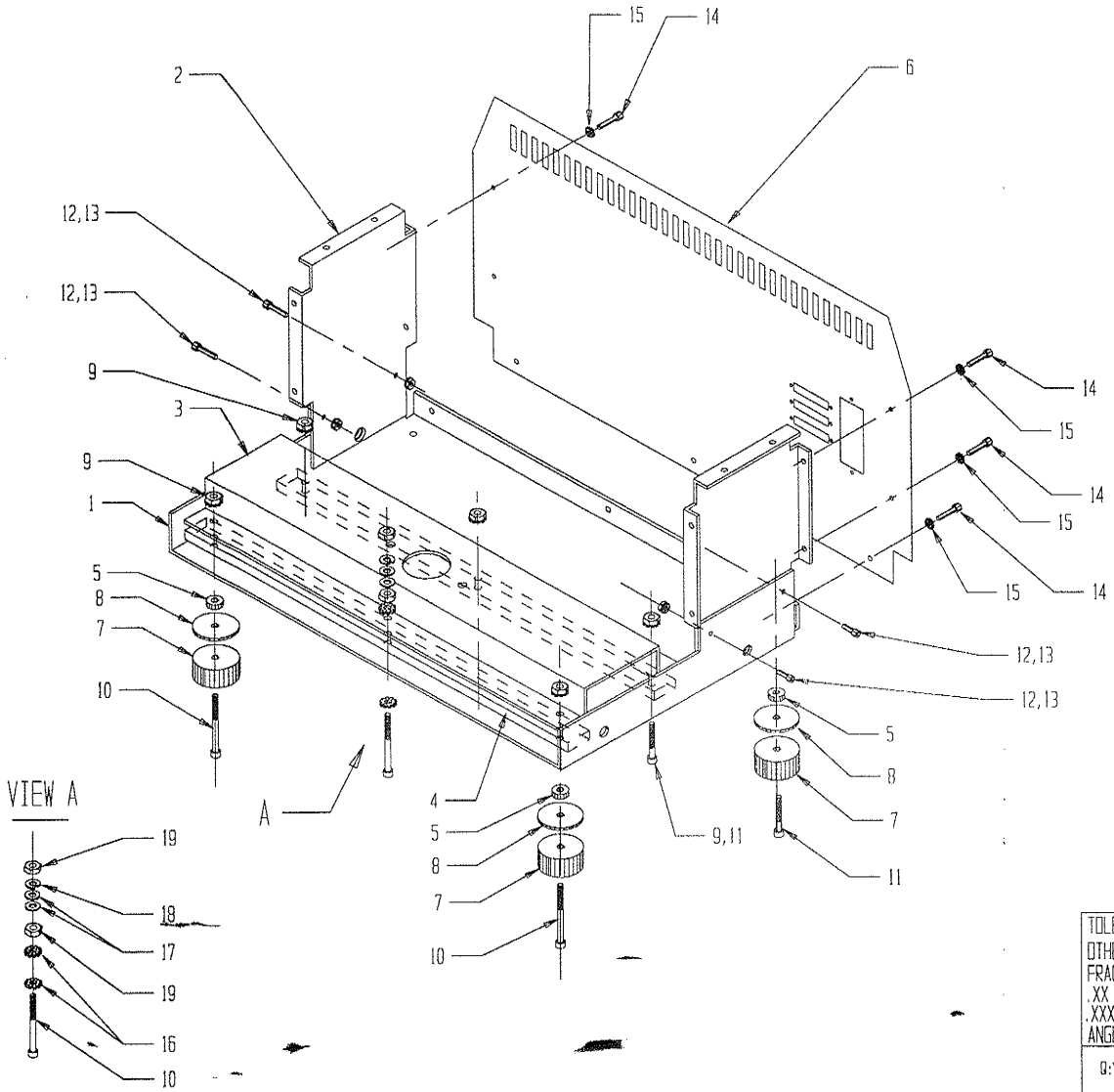
Hardware

4	6-32x3/8" socket head
4	#6 flat washer
4	8-32x1/2" socket head
4	#8 split lock washer
4	#8 large brass flat washer
7	8-32x5/16" socket head
7	#8 external tooth lock washer
1	1/4-20x1-1/2" socket head
3	1/4-20x1" socket head
3	1/4-20 KEP nut
2	1/4-20 brass nut
2	1/4 external tooth lock washer
2	1/4 brass flat washer
1	1/4 bronze split lock washer



ITEM No	PART NAME	QTY.	DWG. No.
1	OUTER CASE	1	LSC142R2
2	BASE MOUNTING BRACKET	1	LSC155R2
3	DISPLAY	1	NORITAKE
4	KEYPAD	1	STORM
5	8-32 KEP NUT	7	90675A009
6	#8 FLAT WASHER	7	92141A009
7	#6-32 NYLON HEX NUT	4	94812A113
8	#6 CLEARANCE 5/16" NYLON STANDOFF	4	HH SMITH P/N 4010
9	#6 FLAT WASHER	4	92141A007
10	M3 NUT	4	91828A211
11	M3 SPLIT LOCK WASHER	4	92148A150
12	M3 FLAT WASHER	4	91475A210
13			
14			
15			

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL ± .020" .XX ± .010" .XXX ± ANGULAR ±	CHARM SCIENCES MALDEN, MA			
	OUTER CASE ASSY			
	SIZE	FSCM NO.	DWG NO. LSC200	REV
	SCALE		SHEET	



ITEM No.	PART NAME	QTY.	DWG. No.
1	BASE PLATE	1	LSC140R4
2	ELECTRONICS CARD RACK BRACKET	2	LSC156
3	SUPPORT PLATE	1	LSC141R2
4	LSC ASSEMBLY SPACER	2	LSC191R1
5	WASHER (3 PER EACH FOOT)	12	90285A150
6	BACK PLATE	1	LSC153R3
7	RUBBER FEET	4	9540K28
8	FLAT FENDER WASHER	4	90313A109
9	1/4-20 KEP NUT	7	90675A029
10	1/4-20 x 1-1/4" SOCKET HEAD	3	92196A544
11	1/4-20 x 1" SOCKET HEAD	5	92196A542
12	8-32 x 3/8" SOCKET HEAD	4	92196A192
13	8-32 KEP NUT	4	90675A009
14	8-32 x 5/16" SOCKET HEAD	7	92196A191
15	#8 EXTERNAL TOOTH LOCK WASHER	7	91114A009
16	1/4 EXTERNAL TOOTH LOCK WASHER	2	91114A029
17	1/4 BRASS FLAT WASHER	2	92916A155
18	1/4 BRONZE SPLIT LOCK WASHER	1	93496A029
19	1/4 BRASS NUT	2	92676A029
20			
21			

TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL ± .020"
.XX ± .010"
.XXX ± –
ANGULAR ± –

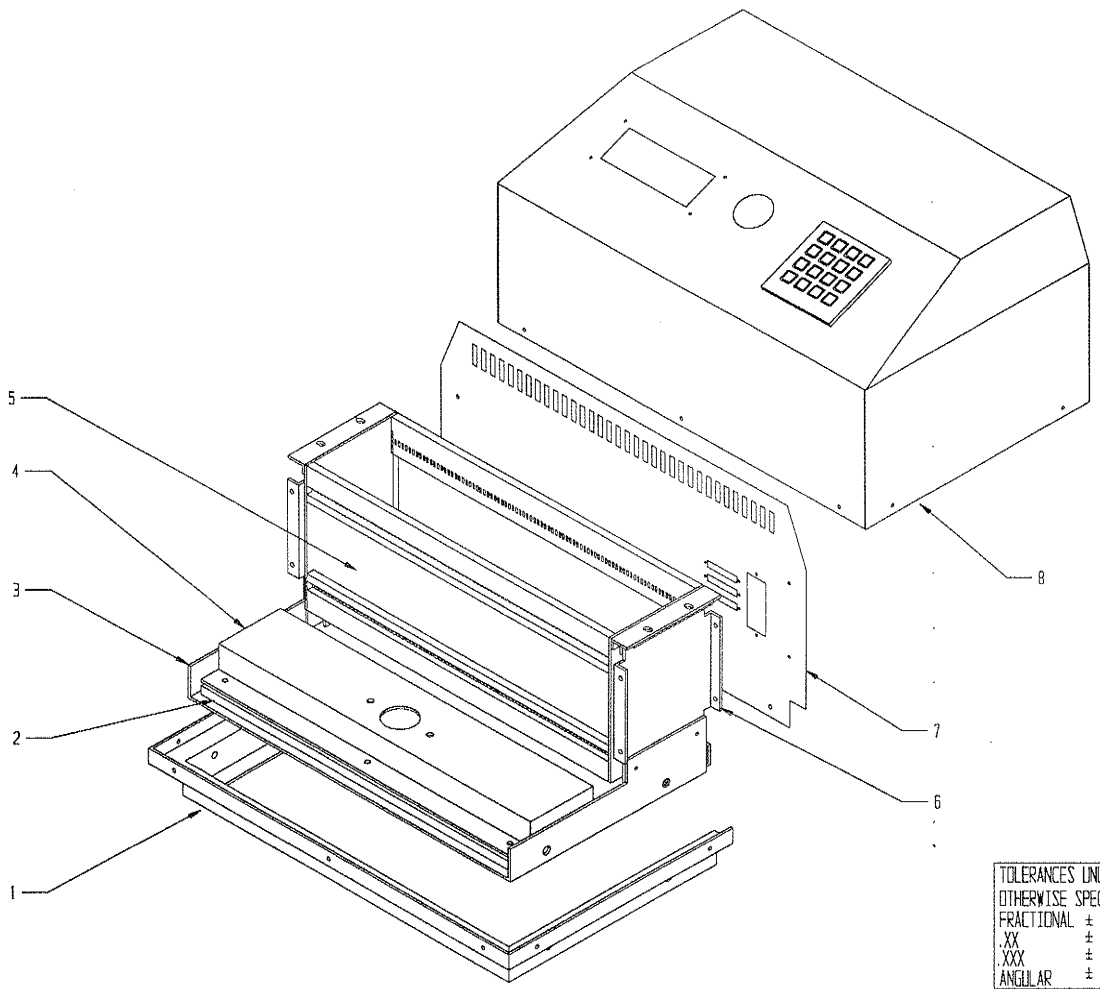
G:\PRODDWG\LSC\CASE\PARTS\PROD

CHARM SCIENCES MALDEN, MA

MAIN CHASSIS ASSEMBLY 1

SIZE	FSCM NO.	DWG NO.	REV
		LSC201	

SCALE | SHEET



ITEM No.	PART NAME	QTY.	DWG. No.
1	BASE MOUNTING BRACKET	1	LSC155R2
2	LSC ASSEMBLY SPACER	2	LSC191R1
3	BASE PLATE	1	LSC140R4
4	ASSY SUPPORT PLATE	1	LSC141R2
5	ELECTRONICS CARD RACK BRACKET	2	LSC156
6	CARD CAGE (ELECTROSPACE)	1	ECFE1854-REV 0
7	LSC BACK PLATE	1	LSC153R3
8	LSC OUTER CASE	1	LSC142R2
9			
10			
11			
12			
13			

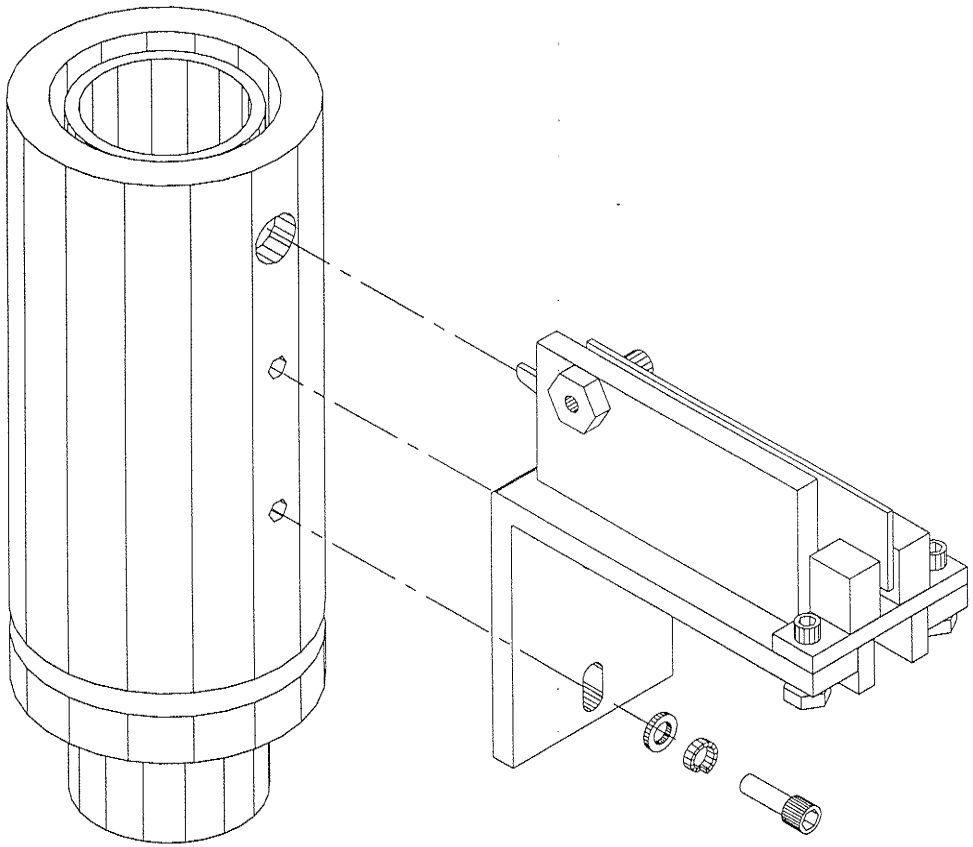
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL ± .020"
.XX ± .010"
.XXX ±
ANGULAR ±

CHARM SCIENCES
MALDEN, MA

MAIN CHASSIS ASSEMBLY 2

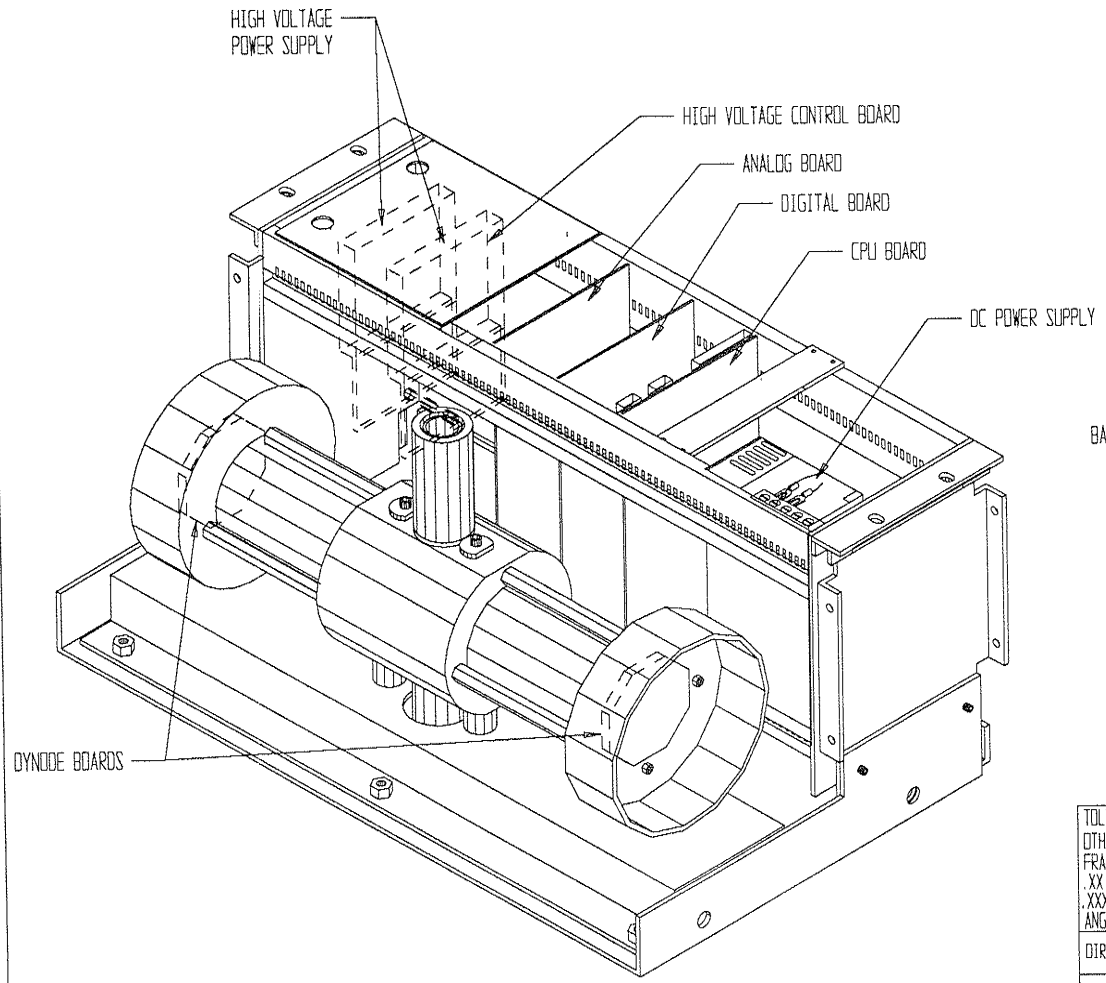
SIZE	FSCM NO.	DWG NO.	REV
		LSC204	
SCALE			SHEET

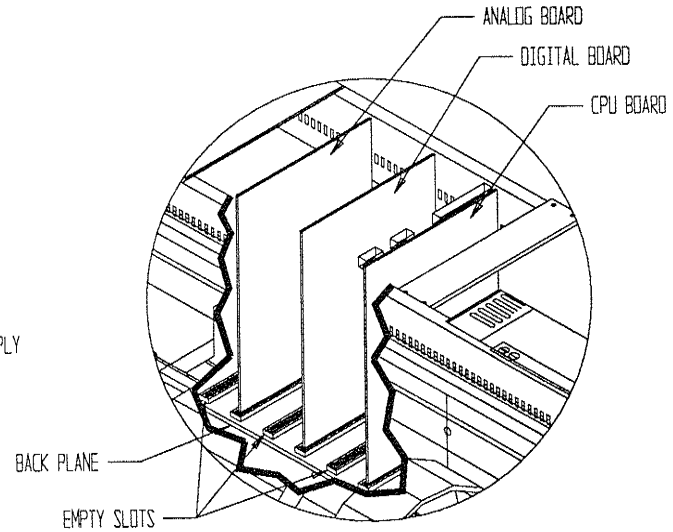
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL ± .02" .XX ± .010" .XXX ± _ ANGULAR ± _	CHARM SCIENCES MALDEN, MA HV SWITCH ASSY 2 SIZE FSCM NO. DWG NO. LSC205 REV SCALE SHEET

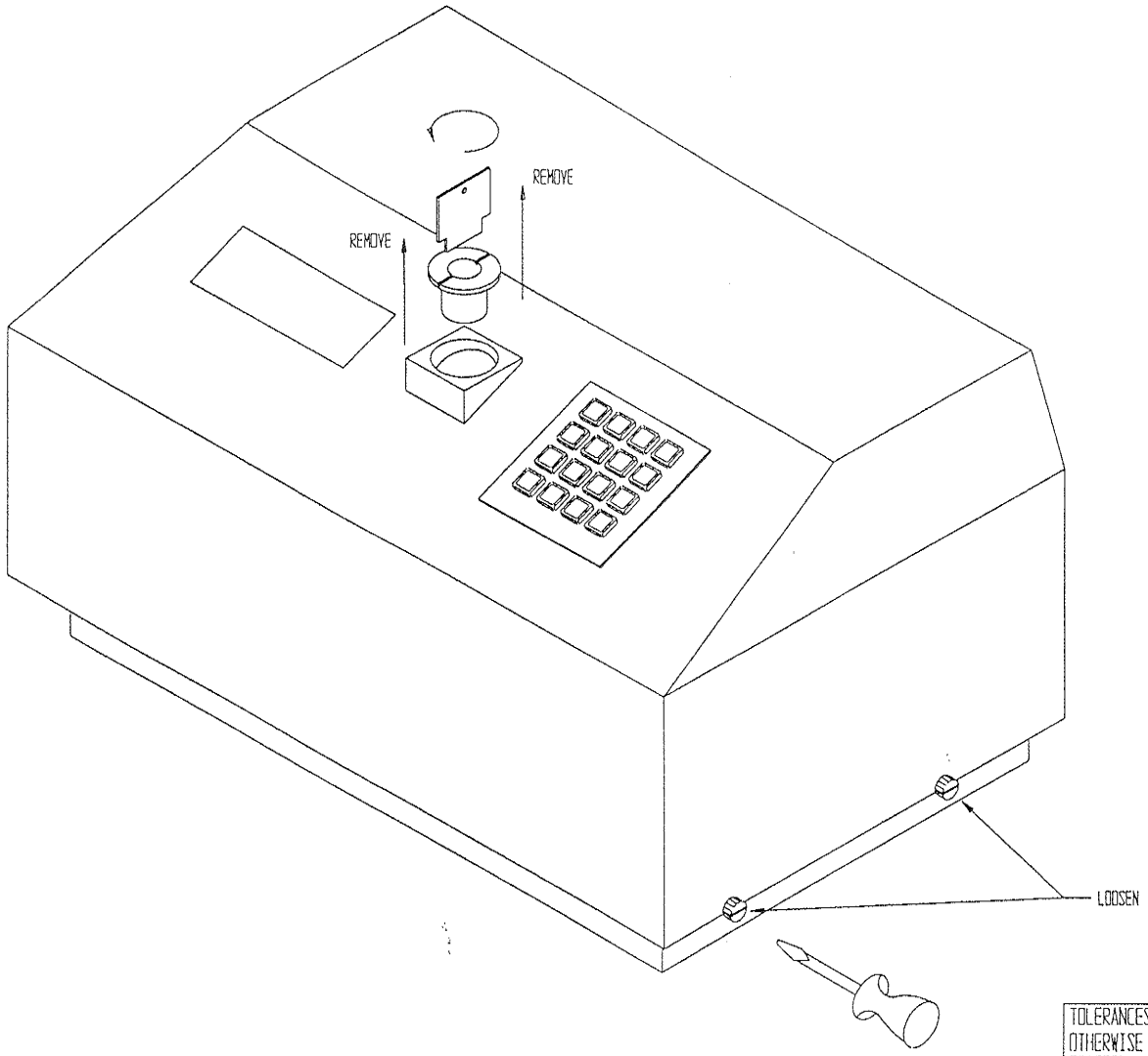
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

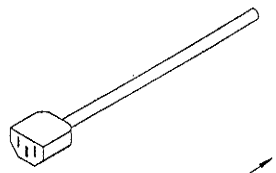




TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL ± .02" .XX ± .01" .XXX ± - ANGULAR ± -	CHARM SCIENCES MALDEN, MA		
	NAME / DESCRIPTION: SPARE PARTS, ELECTRONIC MAIN CHASSIS		
DIRECTORY PATH: Q:\PROD\DWG\LSC3\SERVICE\LSC240	DWG NO. LSC6600/7600		REV 0
DATE: 2-25-97	SCALE: NONE	DWN: J.GRAHAM	SHEET

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

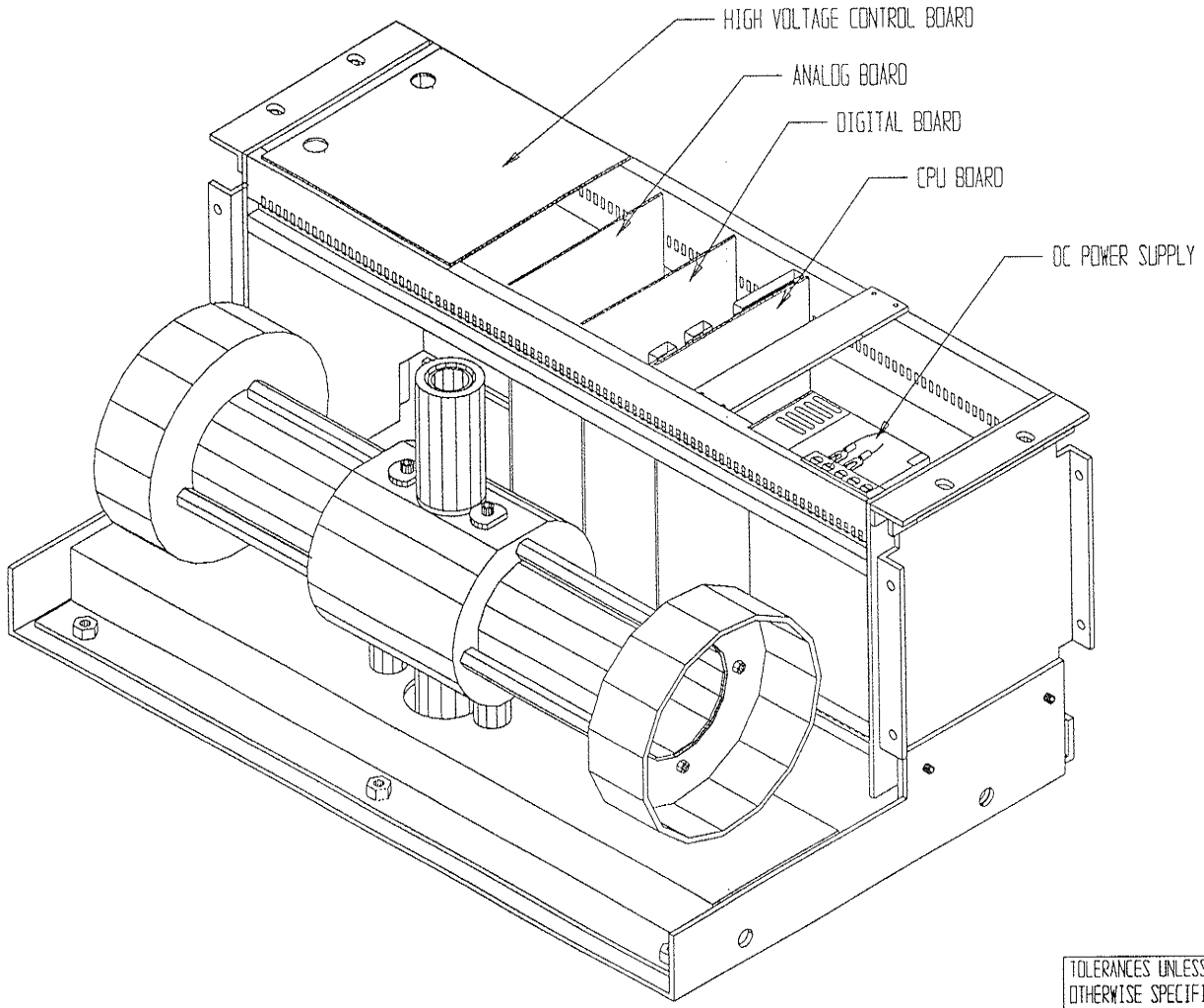




REMOVE POWER CORD

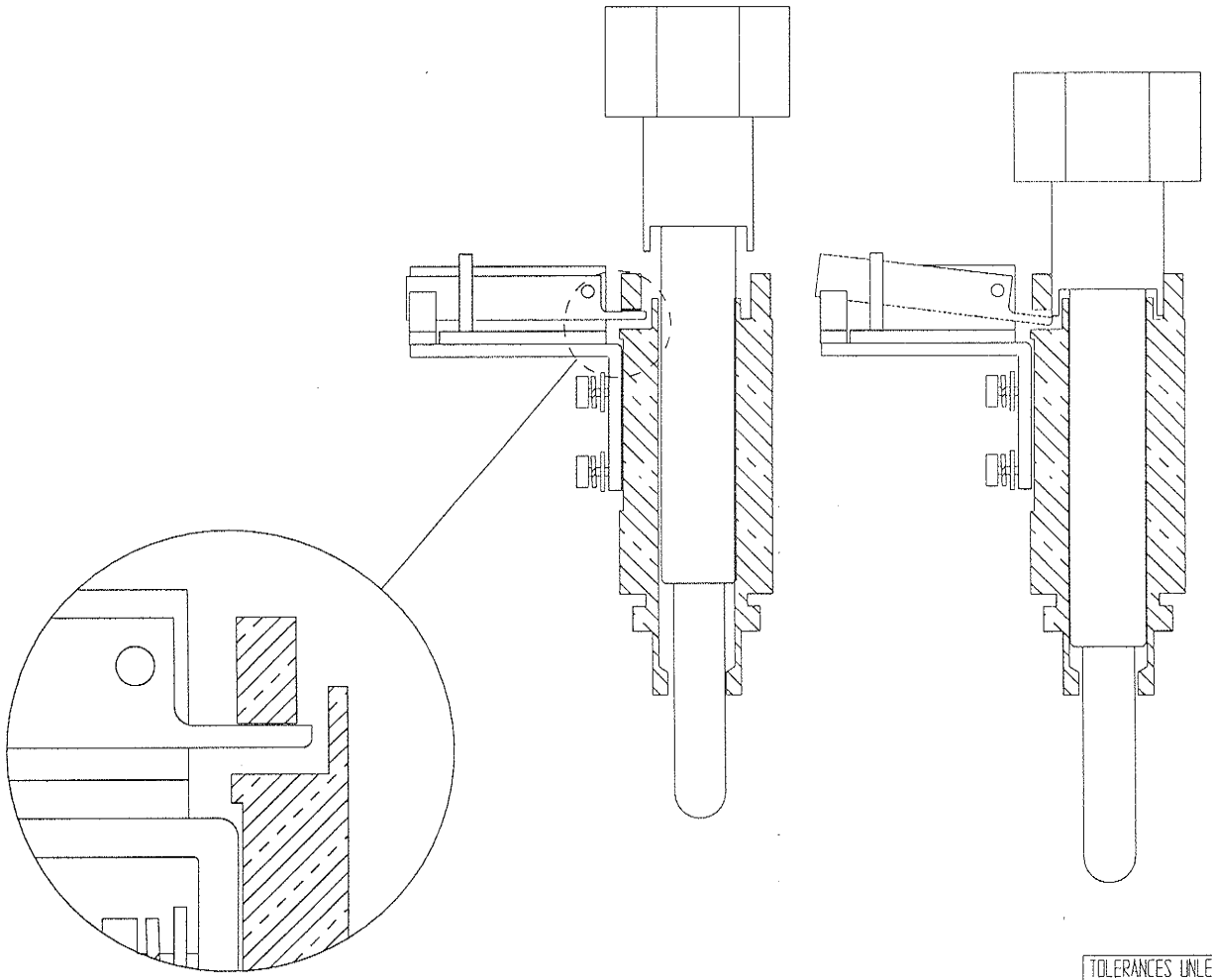
TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL ± .XX ± .020" .XXX ± .010" ANGULAR ±	CHARM SCIENCES MALDEN, MA		
	COVER REMOVAL DIAGRAM		
	SIZE	FSCM NO.	DWG NO. LSC241	REV 0
	SCALE		SHEET

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



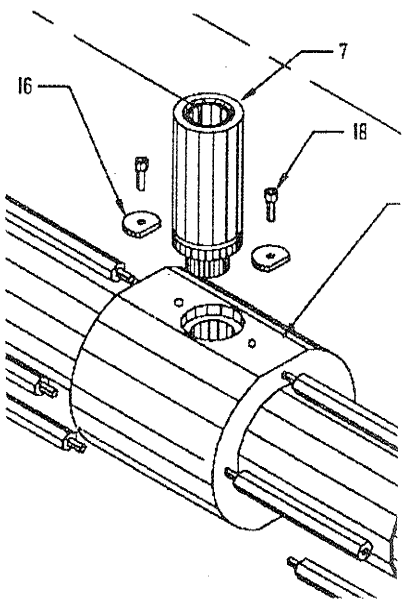
TOLERANCES UNLESS OTHERWISE SPECIFIED:	CHARM SCIENCES MALDEN, MA
FRACTIONAL ± .020"	
.XX ± .010"	SUBASSEMBLY POSITION DIAGRAM
.XXX ±	
ANGULAR ±	SIZE FSCM NO. DWG NO. LSC240 REV 0
	SCALE A. BYALIK SHEET

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS OTHERWISE SPECIFIED:	CHARM SCIENCES MALDEN, MA
FRACTIONAL ± .02" .XX ± .010" .XXX ± ANGULAR ±	HV SWITCH ADJUSTMENT
	SIZE / FSCM NO. / DWG NO. LSC242 / REV
	SCALE / A. BYALIK / SHEET

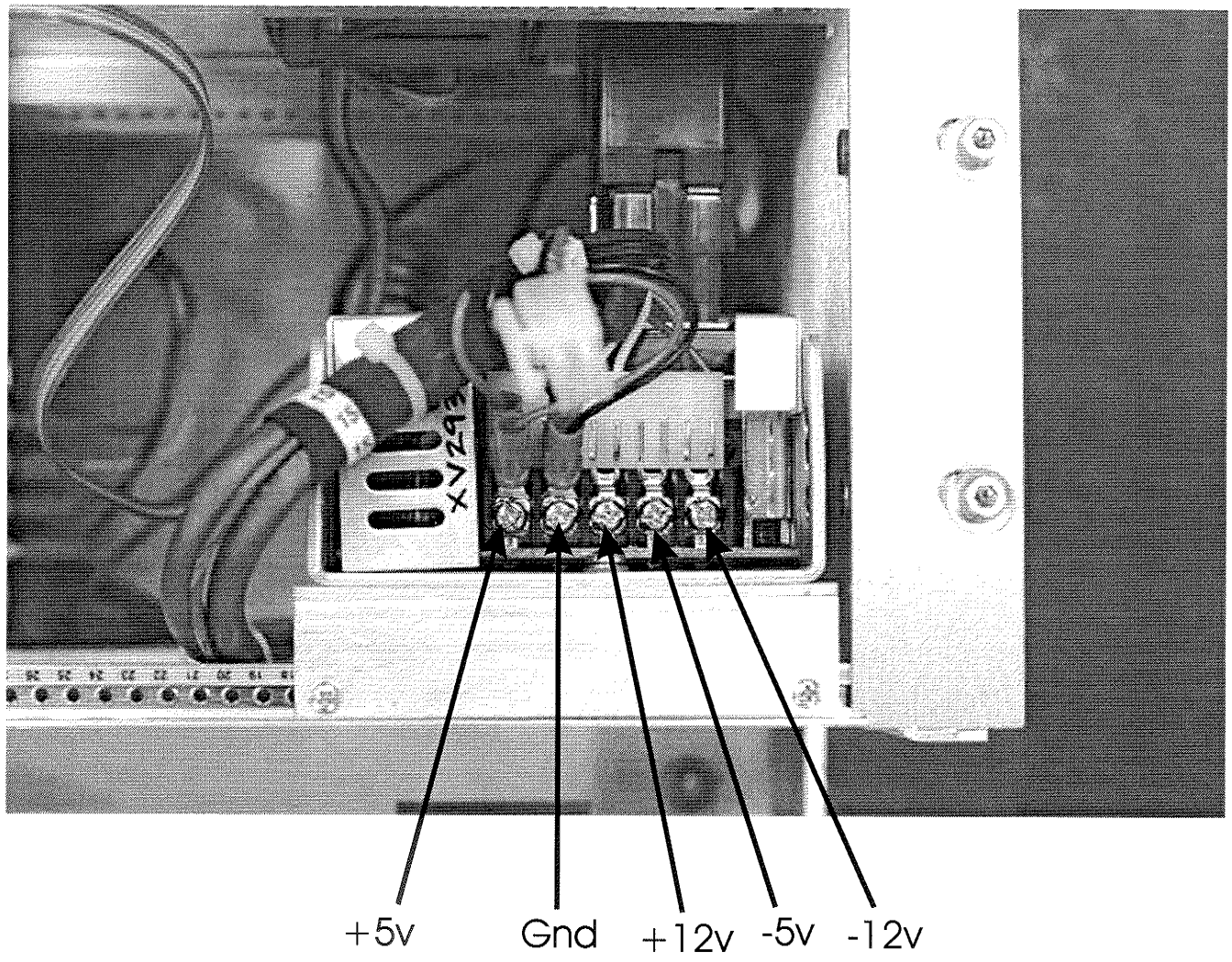
Diagram E



		QTY
7.	Tube Holder Guide	1
16.	'D' washers	2
18.	8-32 x 1/2" cap screws	2

DIAGRAM E

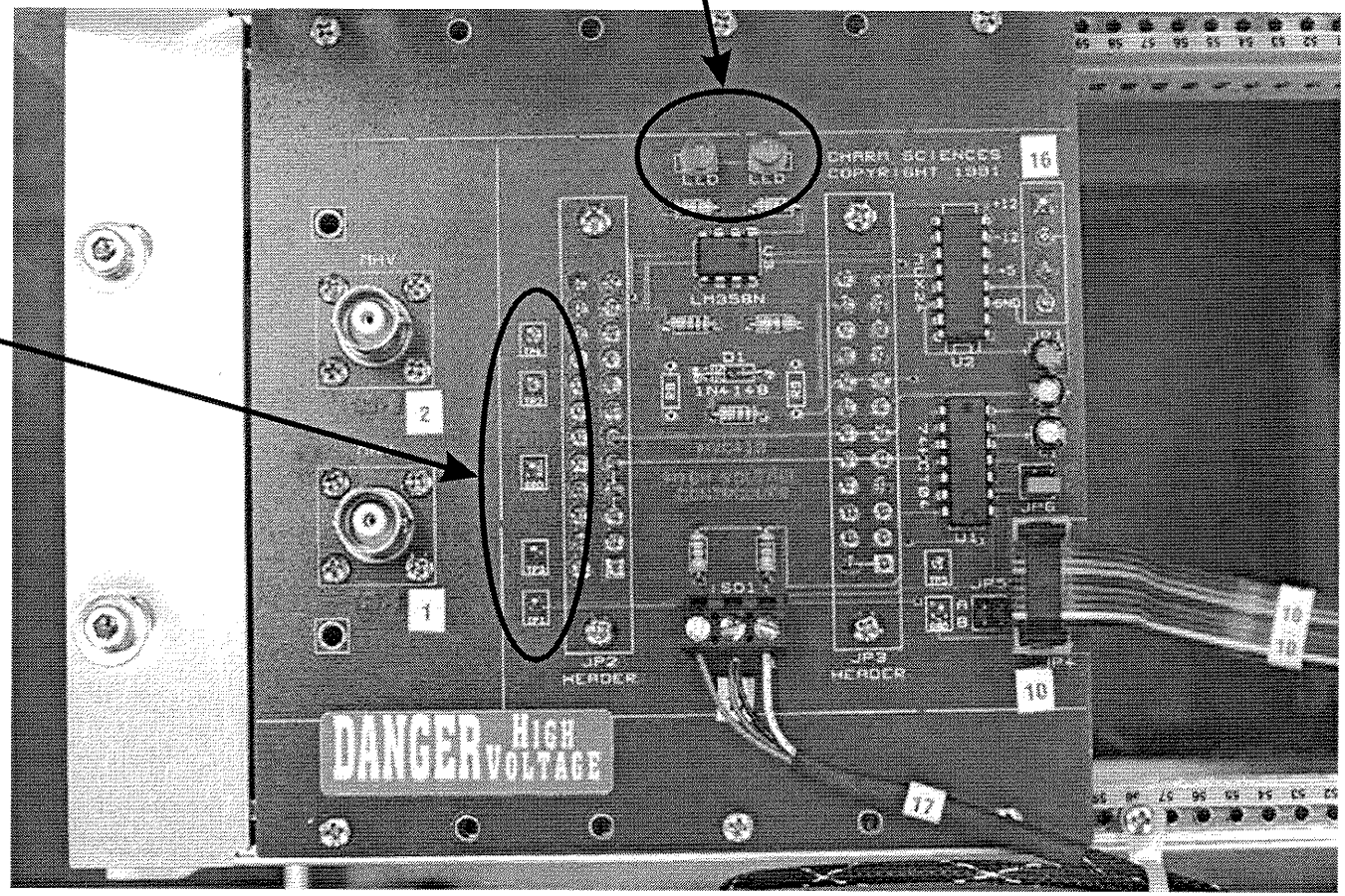
DC Power Supply



High Voltage power supply control board

HV power supply active indicators

Test points TP1 to TP4



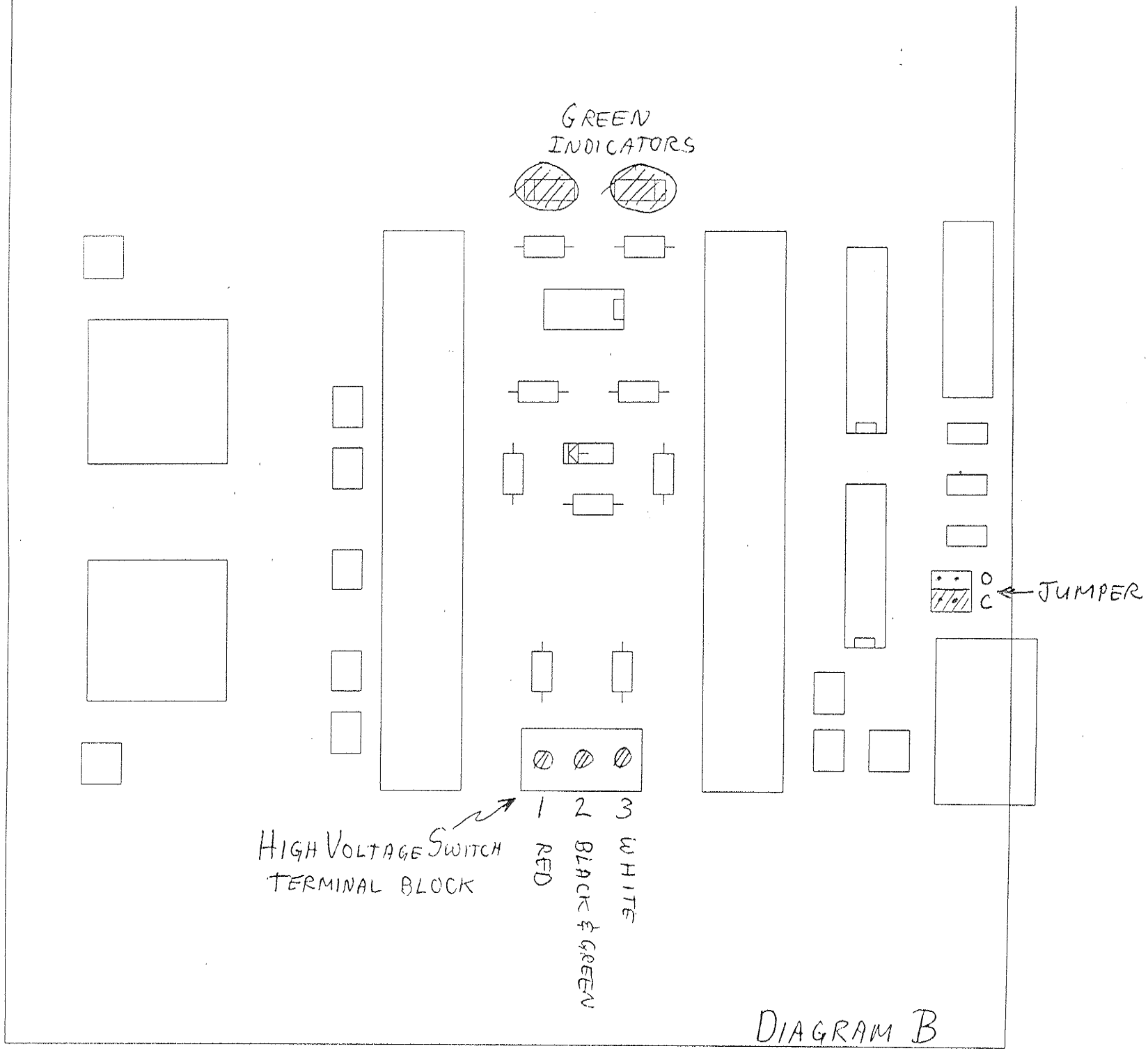
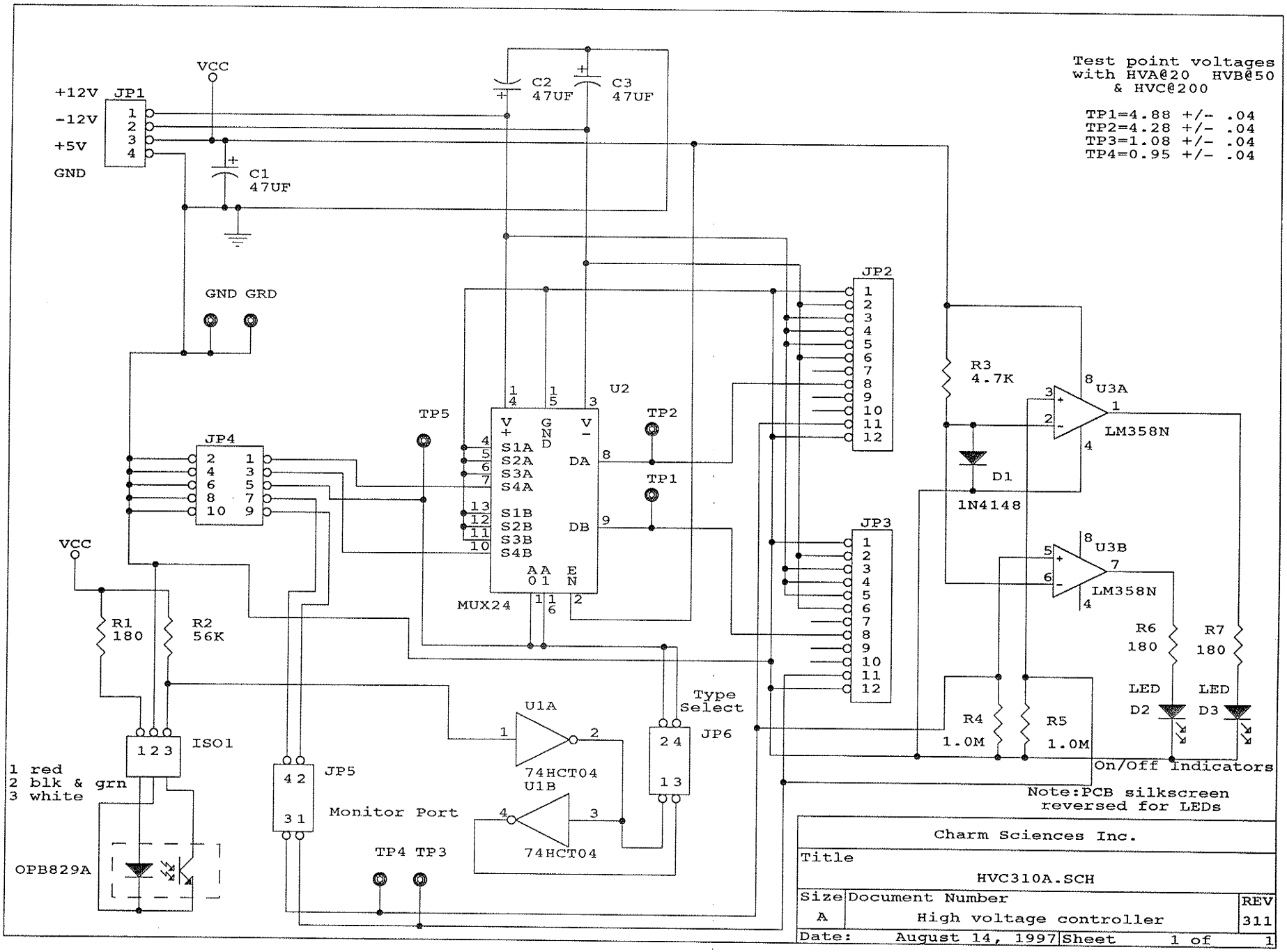
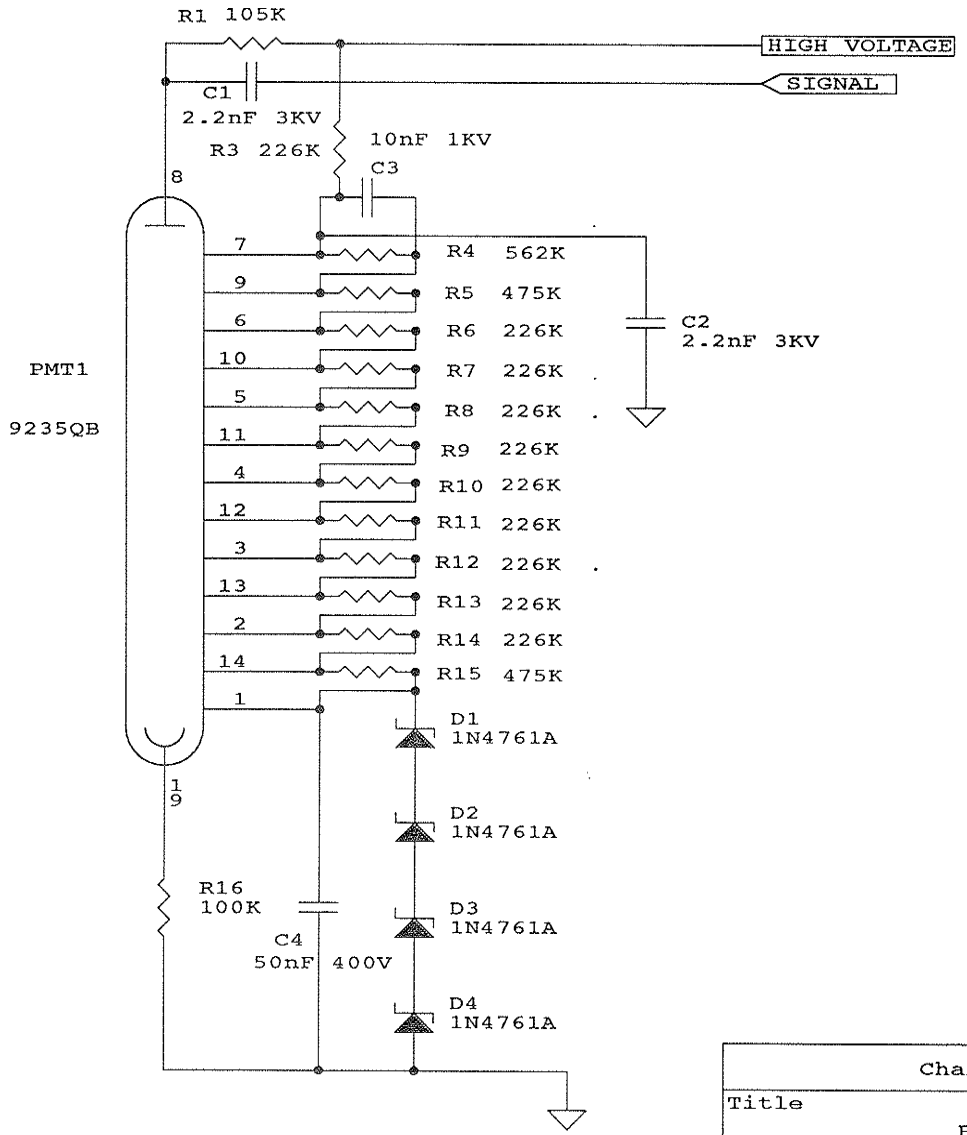

GREEN
INDICATORS
O
C
JUMPER
HIGH VOLTAGE SWITCH
TERMINAL BLOCK
1
2
3
RED
BLACK & GREEN
WHITE

DIAGRAM B


Test point voltages
with HVA@20 HVB@50
& HVC@200
TP1=4.88 +/- .04
TP2=4.28 +/- .04
TP3=1.08 +/- .04
TP4=0.95 +/- .04
+12V
-12V
+5V
GND
JP1
VCC
C1
47UF
C2
47UF
C3
47UF
GND GRD
JP2
JP3
JP4
JP5
JP6
U2
MUX24
TP5
TP2
TP1
TP4 TP3
R1
180
R2
56K
R3
4.7K
R4
1.0M
R5
1.0M
R6
180
R7
180
D1
1N4148
U3A
U3B
LM358N
LED
D2
D3
On/Off Indicators
ISO1
OPB829A
1 red
2 blk & grn
3 white
U1A
U1B
74HCT04
Type
Select
Monitor Port
Note:PCB silkscreen
reversed for LEDs
Charm Sciences Inc.
Title
HVC310A.SCH
Size
A
Document Number
High voltage controller
REV
311
Date: August 14, 1997
Sheet 1 of 1



Charm Sciences Inc.		
Title: Bleeder String		
Size: A	Document Number: BST410.SCH	REV: 411
Date: August 14, 1997	Sheet 1 of 1	